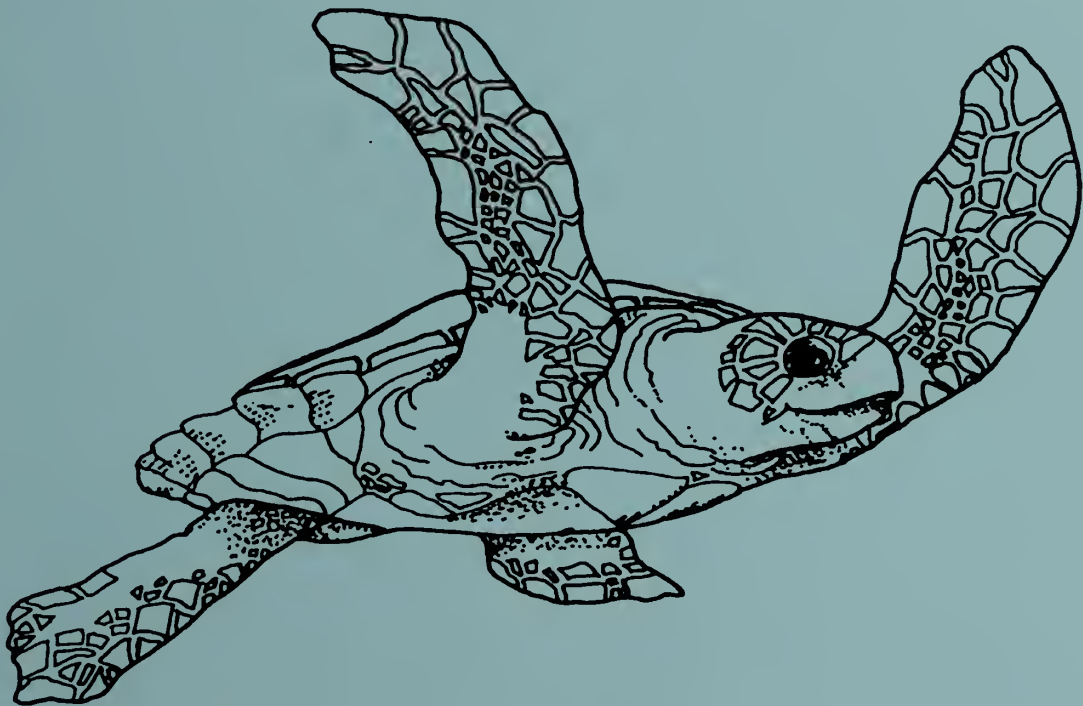


*Hammocks Beach State Park
General Management Plan
and
Master Plan*




HAMMOCKS BEACH STATE PARK
GENERAL MANAGEMENT PLAN
AND
MASTER PLAN

Department of Environment, Health, and Natural Resources

Division of Parks and Recreation

March, 1997



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INTRODUCTION

Planning is an essential element of effective and efficient park administration and management. The North Carolina General Assembly acknowledged its importance by passing state parks system legislation that includes planning requirements.

The 1987 State Parks Act (G.S.114-44.7 through 114-44.14) stipulates that a State Parks System Plan be prepared. The plan was completed in 1988 and revised in 1994. It evaluated the statewide significance of each park, identified duplications and deficiencies in the system, described the resources of the system, proposed solutions to problems, described anticipated trends, and recommended means and methods to accommodate trends.

The State Parks Act also requires each park to have an individual general management plan. The general management plans are required to:

...include a statement of purpose for the park based upon its relationship to the System Plan and its classification. An analysis of the major resources and facilities on hand to achieve those purposes shall be completed along with a statement of management direction. The general management plan shall be revised as necessary to comply with the System Plan and to achieve the purpose of the [State Parks Act].

The general management plan (GMP) is to be a comprehensive five-year plan of management for a park unit. GMP's function to:

1. describe park resources and facilities;
2. state the purpose and importance of each park unit;
3. outline interpretive themes and propose locations for informational and interpretive facilities;
4. analyze park and recreation demands and trends in the park's service area;
5. summarize the primary laws guiding park operations;
6. identify internal and external threats to park natural and cultural resources, and propose appropriate responses;
7. identify and set priorities for capital improvement needs;
8. analyze visitor services and propose efficient, effective, and appropriate means of responding to visitor needs; and
9. review park operations and identify actions to support efficient and effective park administrative procedures.

This GMP for Hammocks Beach State Park, developed with public involvement, is intended to serve these purposes. It also contains the master plan for Hammocks Beach. The master plan gives long-term guidance for park land acquisition and facility development. No master plan has been previously completed for Hammocks Beach State Park.

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I. DESCRIPTION OF HAMMOCKS BEACH STATE PARK

LOCATION AND ACCESS

Hammocks Beach State Park is located in Onslow county about 20 miles east of Jacksonville. From NC 24 in Swansboro, SR 1511 leads to the mainland portion of the park. From here, passenger ferry service is available much of the year to Bear Island. The island is also accessible by private boat or marine taxi service.

FERRY SERVICE

Two 36-passenger pontoon ferries with covers provide transportation to Bear Island. Round trip passenger ferry service from the mainland to Bear Island costs \$2 for ages 13 to 61 and \$1 for children 4 through 12 and for seniors age 62 and up. Children 3 and under are free, but a ticket is still required. Because visitors must be transported off the island at the end of the day, once daily capacity has been reached, the ferry must stop taking passengers to the island. On holidays and summer weekends, lines for the ferry form early and capacity for the island is frequently reached. The ferry does not operate during inclement weather.

Memorial Day Through Labor Day Schedule

On Mondays and Tuesdays during the summer season, the ferry operates on an hourly basis. Wednesdays through Sundays, the ferry departs every half hour. The schedule follows:

<u>Departs Mainland</u>	<u>Departs Bear Island</u>
9:30 a.m. Every Day	10:00 a.m. Every Day
10:00 a.m. Wednesday - Sunday	10:30 a.m. Wednesday - Sunday
10:30 a.m. Every Day	11:00 a.m. Every Day
11:00 a.m. Wednesday - Sunday	11:30 a.m. Wednesday - Sunday
11:30 a.m. Every Day	12:00 noon Every Day
12:00 noon Wednesday - Sunday	12:30 p.m. Wednesday - Sunday
12:30 p.m. Every Day	1:00 p.m. Every Day
1:00 p.m. Wednesday - Sunday	1:30 p.m. Wednesday - Sunday
1:30 p.m. Every Day	2:00 p.m. Every Day
2:00 p.m. Wednesday - Sunday	2:30 p.m. Wednesday - Sunday
2:30 p.m. Every Day	3:00 p.m. Every Day
3:00 p.m. Wednesday - Sunday	3:30 p.m. Wednesday - Sunday
3:30 p.m. Every Day	4:00 p.m. Every Day
4:00 p.m. Wednesday - Sunday	4:30 p.m. Wednesday - Sunday
4:30 p.m. Every Day	5:00 p.m. Every Day
5:00 p.m. Wednesday - Sunday	5:30 p.m. Wednesday - Sunday
5:30 p.m. Every Day	6:00 p.m. Every Day

Off-Season Schedule

In the off season, visitation decreases because of cooler weather, shorter daylight hours, and the school year. As a concomitant, ferry service is reduced as follows:

May & September: Wednesday - Sunday

April & October: Friday - Sunday

Departs Mainland

9:30 a.m.
10:30 a.m.
11:30 a.m.
12:30 p.m.
1:30 p.m.
2:30 p.m.
3:30 p.m.
4:30 p.m.

Departs Bear Island

10:00 a.m.
11:00 a.m.
12:00 noon
1:00 p.m.
2:00 p.m.
3:00 p.m.
4:00 p.m.
5:00 p.m.

LAND BASE

Except for 35 acres on the mainland, Hammocks Beach State Park is located on Bear Island, an 892-acre undeveloped barrier island. Three and one-half miles long and less than a mile wide, the island is bordered by the Atlantic Ocean to the south and by salt marshes, estuarine creeks, and the Intracoastal Waterway to the north. Bogue Inlet lies at the northeast end of the island, while Bear Inlet lies to the southwest.

Bear Island is an unspoiled barrier island that features dunes nearly 60 feet high, maritime shrub and forest, extensive salt marshes, tidal creeks, and a pristine ocean beach.

VISITOR FACILITIES

A small park office, visitor parking lot, waiting station with toilets, pay phone and vending machines, and ferry dock are located on the mainland. Camping permits and tickets for the ferry are sold at the park office, which has a very small reception/display area. A boat ramp is located near the ferry dock, but its use is generally restricted to park staff.

Visitor facilities at Bear Island include a shelter with an outdoor shower and benches that provides a shaded place to wait for the return ferry; a ½-mile-long trail/road that crosses the island to the beach; an interpretive center; a large bathhouse that provides shelter, restrooms, cold-water showers, changing rooms, and a refreshment stand. The bathhouse is operated from Memorial Day through Labor Day only. Six picnic shelters are located behind the frontal dunes on each side of the bathhouse, each with tables and grills. Fourteen primitive camping sites are provided for family (up to six persons) camping behind the frontal dunes near the beach. Three group camps are also provided, serving groups of up to 12 persons. Camping is prohibited at specified times during June, July, and August to minimize disturbance of nesting loggerhead turtles. From Memorial Day through Labor Day, a lifeguard-protected swim area is provided.

Private boats used to reach the island may be beached on shore or tied at the island bulkhead at the ferry dock. Docking space is very limited.

HISTORY OF THE PARK AREA

Bear Island During Prehistory

Although exact dating of the first human habitation of Bear Island is impossible, it is likely that periodic habitation by native Americans occurred shortly after the island's creation around 4,000 B.C. A few arrowheads of Archaic origin have been found on the island. This scant but definite evidence suggests that Bear Island was visited on at least an occasional basis during the Archaic period. Because of the lack of a reliable source of fresh water on the island and the lack of ceramic vessels to transport water, it is likely that Bear Island was never permanently or even seasonally inhabited during the Archaic period. Rather, bands of hunter-gatherers probably came to the island for short periods to hunt small game and collect shellfish before returning to the mainland.

During the Woodland period, the inventions of pottery and the dugout canoe greatly enhanced the ability of native Americans to use Bear Island. The canoe, constructed by hollowing out the trunks of cypress trees with fire and stone adzes, provided an improved means of transportation. The invention of pottery made it possible to stay on the island for longer periods by providing a means for visitors to bring fresh water with them and also a means of storing food surpluses.

Following these inventions, the abundance of shellfish, sea turtles, and other easily gathered seafood led to seasonal occupation of Bear Island. Potsherds, arrowheads, and oyster middens found at several island locations evidence such occupation by native Americans. Indians chipped off the blue part of clam shells and used it as wampum, a form of money, for trading.

Two native American tribes were known to have inhabited Bear island: the Neusiok and the Coree. The Neusiok were an Algonkian tribe with a village at the mouth of the White Oak River opposite Bogue Inlet. The Coree were Iroquoian. Both tribes fought against the English in the Tuscaroran Indian Wars, and both were soundly defeated and forced to retreat northward. By 1713, when Bear Island was first officially recognized as part of North Carolina, native American involvement with Bear Island had ended.

Early History of Bear Island

Early Colonial records identify the island as Bar Banks, Barr Banks, or Bare Banks, so named because of its sparse vegetation. Bear Island's first European owner was Tobias Knight, a wealthy colonist and government official. Knight acquired the island in 1713 but was not known to have even visited it. A close friend and secretary to Colonial Governor Charles Eden, Tobias Knight held many posts within Colonial North Carolina government, including Secretary of State of the colony. These posts gave Knight opportunity to profit through conspiracy with pirates.

Local legend, which cannot be verified, holds that Tobias Knight and Governor Eden allowed the notorious pirates Blackbeard (Edward Teach) and Stede Bonnet to use Bear Island as a hideout

in return for a share of captured goods. The pirates were suspiciously pardoned for crimes in 1718. The inlets and shallow waterways behind the barrier islands provided havens from which pirates could prey upon merchant vessels and in which they could hide and repair damage to their ships.

After about 1720, it appeared that the North Carolina coast had finally shaken its piracy problem. For about 20 years, Bear Island, Bogue Inlet, and Bear Inlet were free of raids. Bear Island, previously a part of new Hanover County, became part of the newly formed Onslow county in 1725.

Beginning in 1741, piracy returned to the area, this time with Spanish privateers preying on English merchant ships. Around 1747, the Spanish navy and privateers made a series of attacks on the North Carolina coast, including at least two attacks on Bear Island. These attacks, known as the Spanish Alarm, were designed primarily to harass English settlements and did little actual damage.

To protect English interests, the Colonial Assembly ordered that a series of small forts be placed near important inlets along North Carolina's coast. During the Colonial period, Bear and Bogue inlets were both commercially important routes from the mainland to the Atlantic Ocean. The inlets served as the primary exit point for ships exporting naval stores, lumber and agricultural products from Onslow County. For this reason, one of the planned forts was designated to be placed on the Bear Inlet side of Bear Island. No records reveal the armament of the fort or its manpower, and the fort's position on the island is no longer known.

From the 1750s to the 1800s, Bear Island was part of a plantation owned by the Starkey family. The portion of the plantation on the east bank of Queen's Creek began to be called Starkey's Hammock in the late 1790s. John Starkey, the first of the Starkeys to own the island, and his son Edward Starkey were both prominent local officials. Edward Starkey served as Speaker of the Colonial House of Commons and as one of the members of the first Council of State under Governor Richard Caswell.

Bear Island in the 19th Century

Early in the 1800s, Daniel Heady, a ship captain from Core Banks, acquired Bear Island. Heady built a house and a whale processing station on the northeastern tip of the island. The station remained in operation until the Civil War. Heady's crew did not engage in whaling, but rather took advantage of whales and porpoises that beached themselves nearby. Apparently such beachings were fairly common at the time because Heady's processing station was one of many similar ones along the Atlantic coast. When whale beachings were scarce, Heady's crew would then hunt porpoises off the beach.

Bear Island remained in the Heady family for four generations, and the island became known during this time as Heady's beach. The remains of the Heady family house and the whaling station are still present on the northeast side of the island, although most of the remains are now under water.

Bear Island played only a small role in the Civil War. For a time in 1862, the island and Bogue

Inlet marked the boundary between Confederate forces based in Wilmington and Jacksonville and Union forces occupying Bogue Banks and New Bern. To protect this boundary, the Confederate Army built a six-gun fort on Huggins Island in Bogue Banks and placed pickets on Bear Island to prevent a Union landing there. The Huggins Island fort was abandoned and burned in 1862 by Confederate forces, and maintenance of the pickets on Bear Island was abandoned.

In March of 1864 a Union gunboat entered Bear Inlet, where it captured and burned a confederate freighter. On another mission that same year, Union forces landed on Bear Island and rescued 43 escaped slaves who had been hiding on the island.

Bear Island during the 20th Century

Dr. William Sharpe of New York City, one of the pioneers of neurosurgery, visited the Onslow Rod and Gun Club in 1914 and fell in love with the region. He subsequently bought a 4,600-acre tract on the Swansboro side of the White Oak River that included both Bear Island and the mainland properties of what is now Hammocks Beach State Park. In his autobiography, *Brain Surgeon*, Dr. Sharpe described the Hammocks as a place "...where everyday is Sunday, where the climate is wonderful the year round."

Dr. Sharpe bought the land to be used for a hunting and fishing preserve, and he hired John Hurst, a local black man, to manage the property. A hunting lodge was built for Sharpe on the eastern end of the island. The hiring of Hurst to manage such a large property angered many local whites who were still feeling the effects of the Civil War. For a wealthy Northerner to come to the economically depressed South, buy a huge tract of land for recreational purposes, and hire a black man to manage it was considered scandalous and was resented.

Dr. Sharpe was a college friend of Franklin D. Roosevelt. This friendship led to Roosevelt personally intervening to save the Hammocks when the area was threatened by highway construction.

For most of the time that the Sharpe family owned it, Bear Island was the scene of nothing more than hunting and fishing. This peaceful existence was interrupted by the second World War. Just prior to the war, U.S. Marines based in Jacksonville used Bear Island as a practice site for amphibious invasions. Many of these practice invasions involved the use of live artillery. During the war, a U.S. Coast Guard observation station was erected on the island to spot German submarines that were attempting to strangle the shipment of American supplies to England. Several of these observation stations were built along the Atlantic coast, and they consisted of little more than an observation tower and a small barracks for the staff. Apparently, no submarines were ever spotted from the station, and it was closed shortly after the war ended.

A large forest fire in 1945 destroyed a significant amount of maritime forest in the central interior of the island. The cause of the fire was never determined. As the sand sheet shifts on the island, the charred remains of burned trees from this fire still occasionally surface.

Creation of Hammocks Beach State Park

Sharpe and Hurst hunted and fished together for many years and became good friends. After

World War II, Dr. Sharpe offered to leave his estate, including Bear Island, to John and Gertrude Hurst in his will as appreciation for the Hurst's service to the Sharpe family. But Mrs. Hurst, who was a school teacher, suggested that the land should instead be given to the N.C. Teachers Association (NCTA), a non-profit group comprised of black educators. At this time, all recreation sites, including beaches, were racially segregated, and there was no beach specified for use by blacks; granting the Sharpe property to the NCTA would remedy this situation. The Sharpes agreed with the Hursts that the use of the property for recreational and educational purposes by blacks was a good idea. The property was transferred in 1950, and operations began in May of 1952.

To administer and develop the property, the NCTA created the Hammocks Beach Corporation, the board of which was composed of Dr. and Mrs. Sharpe and 24 prominent black educators. While the purpose of the corporation was to provide recreational and educational opportunities for all black North Carolinians, it established formal relationships with churches, agricultural groups, and several youth organizations such as 4-H, the YMCA, and the YWCA. The corporation, in cooperation with these groups, began in 1950 to raise money to develop facilities both on the mainland and the island to make the property useful for conventions, retreats, and field trips.

By October of 1955, over 9,000 members of the teachers association had contributed over \$146,000 for initial development of the mainland. This development included a water system, two cottages with six rooms each, a bathhouse, and a building for indoor recreation and refreshments.

The New Farmers of America spent \$70,000 to compete a mainland camp, which was used by New Farmers and other groups. The Negro 4-H clubs of North Carolina raised and spent \$60,000 on their camp site. The state of North Carolina cooperated by building a state-maintained road leading to the mainland waterway that connected highway 24 with the property. The state also completed two branch roads leading from this main road to the New Farmers of America and 4-H Club camps. With this development, the Hammocks Beach Corporation was largely successful in its attempt to provide recreation and educational opportunities for blacks.

With mainland development well underway, attention turned to developing a means of beach access. Attempts to raise money to build a bridge from the mainland to Bear Island yielded over \$100,000 (collected mostly from teachers), but it quickly became apparent that the corporation would never be able to raise the \$1.3 million it would take to build a bridge. Attempts to obtain federal aid for a bridge through Senator W. Kerr Scott were unsuccessful, and likewise, no state funds were available for such a purpose. Dredging a canal from the mainland to Bear Island and establishing ferry service emerged as a more feasible alternative. Because part of the deed agreement between the Sharpe family and the corporation directed that the corporation would have to return the land to the Sharpe family if it failed to make use of the island, the corporation entered into negotiations with the state in 1956 to make a state park out of Bear Island. The corporation's original offer to the state included provisions to deed all of Bear Island and a 1.75 acre mainland tract to the state on the condition that the state build and maintain a bridge to the park and allow all concessions on the island to be run by the corporation. The state, while interested in obtaining the land for a state park, was nevertheless unwilling to accept the land on these terms. After further meetings with representatives of the state, the corporation again offered the tracts to the state in return for the construction and maintenance of a ferry channel and the

concession rights. Again the state refused. While it is clear that the state refused to take the land on these terms because of an established practice of not giving concession contracts to private corporations, it is unclear why the Hammocks Beach Corporation would offer the land to the state on these terms in the first place. As has already been noted, the corporation had by this time raised over \$100,000 toward increasing the accessibility of Bear Island. According to state documents, constructing a ferry channel from the mainland and purchasing a ferry would have cost the corporation less than \$80,000.

The Hammocks Beach Corporation and NCTA continued fund raising efforts and plans to further develop the mainland property. In 1958 development was proposed for four additional spur roads on the Swansboro side of the property for smaller camps for individuals and small groups. The development — which never got underway due to a lack of funds — was to have included a large beach parking area, tennis courts, baseball diamond, roller skating rink, play area, golf course, and fishing pier.

Without access to Bear Island and the ocean, however, the mainland development remained less attractive. A report describing the progress that had been made and future plans for development was assembled and submitted to Governor Luther Hodges at his request in March of 1958. The report also included an appeal made for state assistance in cutting new spur roads, improving the existing spur roads, and, most importantly, providing for access to Bear Island and development of a state park on the island. After some negotiating, in return for the construction of a ferry channel and a promise to provide access to the island, the corporation resolved to donate the tracts to the state. Based on a verbal agreement between state officials and the board of the Hammocks Beach Corporation to turn over all rights to the land "free and clear," the state appropriated over \$300,000 for this creation of Hammocks Beach State Park. With this agreement in hand, the transferral of ownership from the corporation to the state should have been a straightforward affair. It turned out to be quite involved.

Although the state had appropriated money for the creation of a state park on Bear Island, none of that money could actually be spent until the land had been officially transferred to state ownership. But to provide the state with the "free and clear" ownership that it required, a friendly condemnation of the deed between the Sharpes and the Hammocks Beach Corporation was necessary because of the complexity of the provisions within it. Unfortunately for everyone involved, in 1958, before the condemnation could be accomplished, Dr. Sharpe was seriously injured and became incapacitated. The legal duties surrounding the condemnation of the deed fell to Mrs. Sharpe, who had been absent during the corporation's negotiations with the state. Acting out of St. Petersburg, Florida, Mrs. Sharpe was unaware of the concessions to the state made by her husband and refused to go through with the condemnation.

Negotiations continued, and after Dr. Sharpe's death in 1960, the legal matters with Mrs. Sharpe and her children were finally resolved and friendly condemnation papers signed. The condemnation was necessary to remove restrictions on use that existed in the condemnees' title. Hammocks Beach State Park was opened in May of 1961, thereby finally fulfilling the goals set forth in the charter of the Hammocks Beach Corporation. Though it had to give up all rights to the island in the process, the corporation managed, after 11 years of effort, to create a facility for the exclusive recreational and educational use of black people. Ironically, almost as soon as the black community had achieved exclusive use of the island, the federal Civil Rights Act of 1964

took it away from them. The Act mandated the end of all racially based segregation in public places and therefore opened Bear Island to whites. Because the Civil Rights Act also opened other beaches to blacks, it made the donation of Bear Island to the state unnecessary as a means of providing blacks with recreational opportunities. Nevertheless, Hammocks Beach State Park became known in the 1960s as a black beach, a reputation it slowly lost, however, with the gradual increase in racial integration.

From 1962 to 1966, construction was completed on the island bathhouse and refreshment stand building, toilets for the picnic area, water system, shop, maintenance buildings, personnel barracks, and ferry landing facilities. Beach grass and shrubs were planted in the vicinity of the maintenance and service area, along the access road from the ferry to the bathhouse, and at other areas of severe sand migration in an attempt to stabilize the dunes and sand movement. These efforts were largely unsuccessful. The first ferry, Anna Kay, was a twin screw 450 hp. diesel owned by Hatteras Towing and Salvage Company. It operated from June to September and had a 51-person capacity. In 1988, the state purchased 30 mainland acres from the Hammocks Beach Corporation to add to its existing three mainland acres.

The Loggerhead Turtle

In 1973, when the United States government passed the Endangered Species Act, loggerhead turtle populations had been in decline for several years. This Act was designed to prevent the extinction of imperiled animals and plants and create a national program to conserve endangered wildlife throughout the world. Under this law, the U.S. Fish and Wildlife Service was granted broad powers to protect all forms of wildlife determined to be in danger of extinction. The Secretary of Commerce, acting through the National Marine Fisheries Service, was granted similar authority for protecting marine life.

One of the provisions of the Endangered Species Act is the mandate to protect habitats — the areas of land, water, and air space that an endangered or threatened species needs for survival. Such areas include breeding sites, cover and shelter, and sufficient habitat space to allow for normal population growth and behavior. Bear Island, as one of the last unlighted islands on the North Carolina coast, provides one of the most important breeding habitats remaining in North Carolina for the loggerhead turtle. Although the loggerhead was not classified as threatened until 1978, studies of its nesting behavior and habitat needs were begun on Bear Island as early as 1975. Since then, Bear Island has become an increasingly important part of the effort to save the loggerhead. In 1980, the U.S. Department of Interior recognized Bear Island's outstanding natural resources by designating it a National Natural Landmark.

II. PARK PURPOSES

MISSION STATEMENT OF THE NORTH CAROLINA STATE PARKS

The North Carolina state parks system exists for the enjoyment, education, health, and inspiration of all our citizens and visitors. The mission of the state parks system is to conserve and protect representative examples of the natural beauty, ecological features, and recreation resources of statewide significance; to provide outdoor recreation opportunities in a safe and healthy environment; and to provide education opportunities that promote stewardship of the state's natural heritage.

HAMMOCKS BEACH STATE PARK PURPOSE STATEMENT

Dr. William Sharpe of New York, a pioneer of neurosurgery, bought 4,600 acres including Bear Island in 1914 after visiting and admiring the area's natural resources. Dr. Sharpe used the land as a hunting and fishing preserve and hired John Hurst to manage the property and serve as a hunting guide. Years later, Dr. Sharpe offered to will the land to the Hursts, but they suggested that it instead be given to the North Carolina Teachers Association (NCTA), a non-profit group comprised of black educators. Dr. Sharpe agreed, and in 1950 the property was transferred for use by blacks for recreational and educational purposes.

The NCTA created the Hammocks Beach Corporation to administer the property, establishing a board composed of Dr. Sharpe and 24 prominent, predominantly black educators. Because of the relative inaccessibility of Bear Island and the lack of money to provide access and development, the corporation was unable to make use of the island. This violated a condition of the deed, and so the corporation entered into negotiation with the state, first to provide access and later to make a state park of Bear Island. The corporation and the Sharpes donated the island and a small mainland area to the state in 1961. Initially operated as a state park for black citizens, the park was opened to all people in 1963. Recognizing the island's outstanding natural resources and beauty, the U.S. Department of the Interior designated it a National Natural Landmark in 1980.

The park's significant geological feature is Bear Island, an 892-acre barrier island that is three and a half miles long and less than a mile wide. Bear Island is one of the largest remaining undeveloped barrier islands on the North Carolina coast, and it is one of the best examples of aeolian, or wind-shaped, landforms on the Atlantic Coastal Plain. This unspoiled island has dunes that are nearly 60 feet high, and it also features maritime forest, extensive salt marshes, and tidal creeks. The island is an exemplary example of how natural, dynamic coastal forces create and maintain barrier islands.

The park's significant biological resources are found on Bear Island. The island is known to support a wide variety of rare species and undisturbed high quality natural communities and has been designated as a Registered Natural Heritage Area. Examples of natural communities include maritime shrub, maritime evergreen forest, and salt marsh. Over a dozen rare plant species have been documented, including seabeach amaranth, which has been listed as federally threatened. The island also supports over a dozen rare animal species, but it is best known and most notable

for its role as a sea turtle nesting site. Loggerhead turtles (federally threatened) routinely nest on Bear Island, and a monitoring program has been in place since 1975. Other rare turtle species on the island include the green turtle, the leatherback turtle, and the diamondback terrapin. Although they do not nest in the park, several rare bird species visit the island, including the bald eagle, the brown pelican, and the snowy egret.

Beginning with the passenger ferry ride from the mainland through the broad salt marshes to Bear Island, visitors who venture into this special park are rewarded with many vivid and lasting images: blue skies with sunlight shimmering on the water; boating on the Intra-coastal Waterway; abundant bird life feeding in tidal marshes or in graceful flight; gentle breezes bending sea oats; and distinctive smells and colors of the marine world. The scenic beauty continues on Bear Island. The high sand dunes and sand ridges make the half-mile walk from the ferry landing to the beach seem like a trip through a desert. From the bathhouse, visitors are rewarded with a panoramic view of a pristine beach and unspoiled island. Sunrises and sunsets are spectacular. Shrub thickets, maritime forest, animal life, inland waters, and the Atlantic Ocean all contribute to visitors' experiences of peace and beauty and help them forget the stresses of everyday life.

Hammocks Beach State Park's Bear Island contains a natural environment that is quiet, peaceful, and uncrowded. In keeping with this setting, a variety of compatible recreational opportunities are available to visitors. These include primitive camping for individuals and groups, picnicking, hiking, ocean swimming, the ferry ride, fishing, birding, and walking on the 3.5-mile-long ocean beach. Interpretation and educational activities focus on the barrier island, its history, and its plant and animal life. To preserve the island's uniqueness, its visitation is limited by the size and schedule of the passenger ferries. Appropriate recreational facilities are also planned for the mainland, dependent upon additional land acquisition.

Bear Island has had a long but sparse history of human habitation. Ancient artifacts have been found among the large dunes of the island, likely left by bands of hunter-gatherers that came to the island for short periods to hunt and collect shellfish. With the invention of the dugout canoe and pottery, which allowed fresh water to be transported, native American habitation for longer periods began. Significant archaeological resources have been documented on both the mainland and Bear Island. A large Woodland Period (approximately 550 AD) shell midden was identified on the mainland. Excavations have revealed ceramics, storage pits, and a hearth. Several shell middens of unknown age or quality have also been discovered on Bear Island. In the early 1700s, the inlets on either side of the island were favorite haunts for shallow-draft pirate vessels that preyed on the deeper draft merchant vessels passing by. The area was subject to a series of attacks by the Spanish, prompting the construction of a small fort in 1749 somewhere on the island. In the early 1800s, a house and whale processing station were built on the northeastern tip of the island. Confederate troops were stationed on the island, and just prior to World War II, the island again assumed military importance when it was used as a practice site for amphibious invasions and artillery fire. During the war, a U.S. Coast Guard observation station was established to spot German submarines.

Hammocks Beach State Park exists so that its valuable geological, biological, scenic, recreational, and archaeological resources will be protected. The Division of Parks and Recreation is charged with preserving these values and providing experiences that promote pride in and understanding of this treasured natural heritage.

III. SUMMARY OF INTERPRETIVE THEMES

The 1987 State Parks Act defines the purposes of the state parks system. It establishes that:

The state of North Carolina offers unique archaeologic, geologic, biologic, scenic and recreation resources. These resources are part of the heritage of the people of this State. The heritage of a people should be preserved and managed by those people for their use and for the use of their visitors and descendants.

It further provides that:

Park lands are to be used by the people of this State and their visitors in order to promote understanding of and pride in the natural heritage of this State.

One of the best methods of fulfilling these purposes is through environmental education. The definition of environmental education as set forth in *The North Carolina Environmental Education Plan* is as follows:

Environmental Education is an active process that increases awareness, knowledge and skills that result in understanding, commitment, informed decisions and constructive action to ensure stewardship of all interdependent parts of the earth's environment.

Hammocks Beach State Park is well suited to environmental education with its excellent representation of undeveloped barrier island habitat and its status as a prime loggerhead nesting beach.

Hammocks Beach has three primary themes and six secondary themes. Primary themes include the loggerhead sea turtle, barrier island ecology, and local cultural history.

PRIMARY INTERPRETIVE THEMES

Loggerhead Sea Turtle

The loggerhead sea turtle is the focus of the Environmental Education Learning Experience (EELE) for the park, as well as the majority of interpretive programs given to the general public. Major concepts within this theme include the sea turtle's life history, migration routes, nesting requirements and behavior, reasons for endangerment, and park resource management efforts.

Barrier Island Ecology

This theme relates the dynamic geology of a barrier island to the associated flora and fauna that must adapt to it. A cross-section of the island reveals different natural communities that have adapted to specific environmental conditions. Some examples of these communities include upper beach, dune grass, salt marsh, and maritime forest. The ways in which humans can affect barrier island ecology is an important concept within this theme.

Local Cultural History

The third primary theme focuses on the cultural history of the area. Topics under this theme include the use of Bear Island by Native Americans and pirates, as well as the role Bear Island played in the protection of the mainland during colonial times, the Civil War, and World War II. This theme also includes the role of Dr. Sharpe, the Hursts, the N.C. Teachers Association, and the Hammocks Beach Corporation in the creation of Hammocks Beach State Park.

SECONDARY INTERPRETIVE THEMES

Secondary themes for the park support and embellish the primary themes and are listed below.

- general coastal ecology (marine organisms and their adaptations to the environment)
- stewardship and resource management (beach clean-ups, coastal environmental issues)
- weather and climate (hurricanes, sea level rise, Northeasters)
- water safety and hazards (rip currents, undertow, man-o-war)
- human's use of the coastal environment (clamming, fishing, shell collecting)
- astronomy
- colony nesting shorebirds

IV. PARK AND RECREATION DEMAND AND TRENDS

ANNUAL VISITATION TRENDS

As shown in Figure IV-1, Hammocks Beach State Park's annual visitation was relatively steady from 1988 through 1993. In 1994, visitation jumped approximately 40 percent to 153,300. Some of the reason for this large jump is the increased traffic concomitant with new residential development nearby on the Swansboro side of the mainland park; some of the increase is due to increased interpretation and education programs that have attracted additional visitors; and some of the increase can be explained by favorable weather that resulted in increased off-season park usage. Summer visitation also reached higher levels in 1994 and 1995, indicating that more people are finding Hammocks Beach a desirable place to visit. The visitation figures shown in Figure IV-1 are recorded by a traffic counter at the mainland park entrance. A persons-per-vehicle multiplier of three has been used.

Bear Island's visitation is recorded by the number of ferry tickets sold (see Figure IV-2). The ferry capacity and schedule — which has been extended in the off season in recent years — serves as a means of limiting visitation to Bear Island. The ferry often runs at or near capacity during the summer season. Prior to 1990, the ferry was free; since 1990, a passenger fee has been charged. Visitors also access Bear Island by private boat and marine taxi, but no figures for such visitation are available.

MONTHLY VISITATION TRENDS

Monthly visitation at Hammocks Beach varies considerably (Figure IV-3). Summer school vacations allow more people to visit, and warmer weather also induces more people to visit. July has the highest average monthly visitation, 21,190. Approximately 80 percent of visitation takes place in the warmest six months from April through September. Monthly ferry passenger totals show a similar pattern of visitation.

INTERPRETATION AND EDUCATION TRENDS

During 1995, park staff presented 1,041 interpretive and environmental education programs to 23,381 people. A variety of programs were held, including hikes, slide shows and talks, and the ferry ride was used extensively for educational purposes. Programs were also conducted away from the park. Audiences included the general public, school groups, and organizations such as the N.C. Nature Conservancy, N.C. Coastal Federation, Sea Coast Explorers, Boy Scouts, Camp Mitchell 4-H Camp, N.C. Museum of Natural History, and local park and recreation departments.

Park staff have greatly increased the number of visitors exposed to interpretation and education programs in recent years (Figure IV-4). In addition to these programs, visitors also receive roving interpretation, estimated at 1,140 for 1995.

Annual Visitation 1988 - 1995

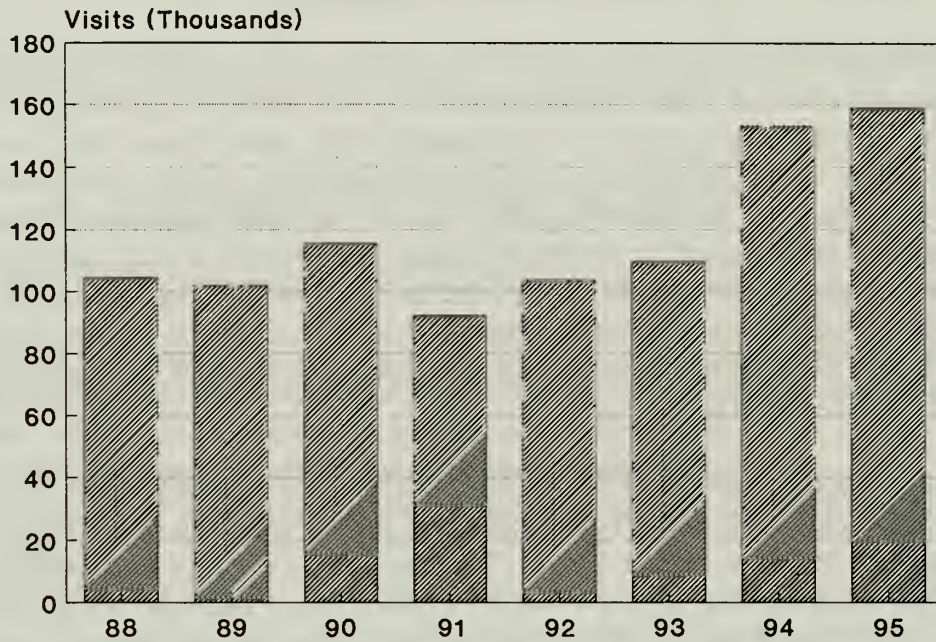


Figure IV-1. Hammocks Beach State Park Annual Visitation

Ferry Passengers 1988 - 1995

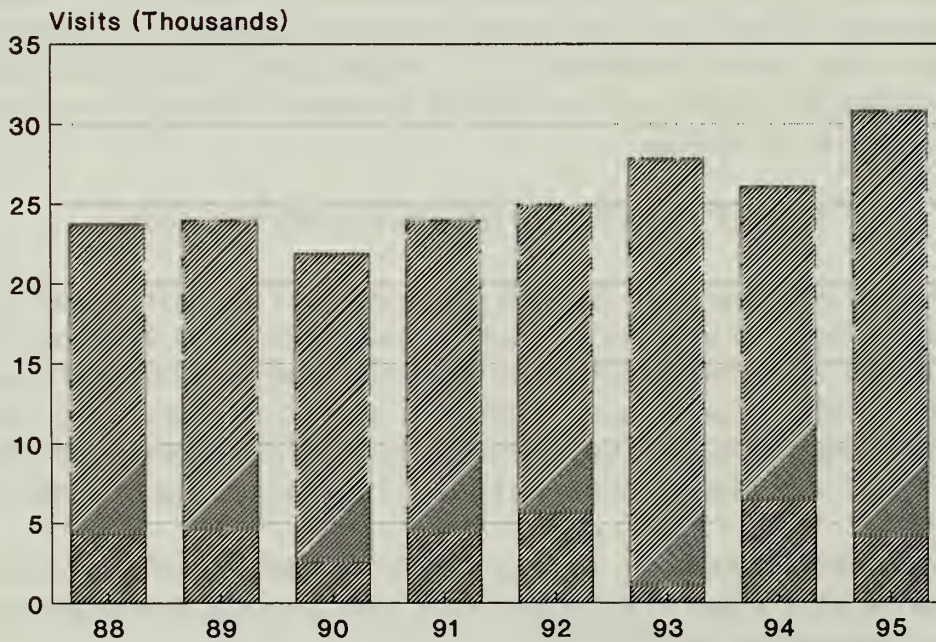


Figure IV-2. Hammocks Beach State Park Ferry Passengers

Monthly Visitation (Averaged) 1991, 1992, 1993, 1994

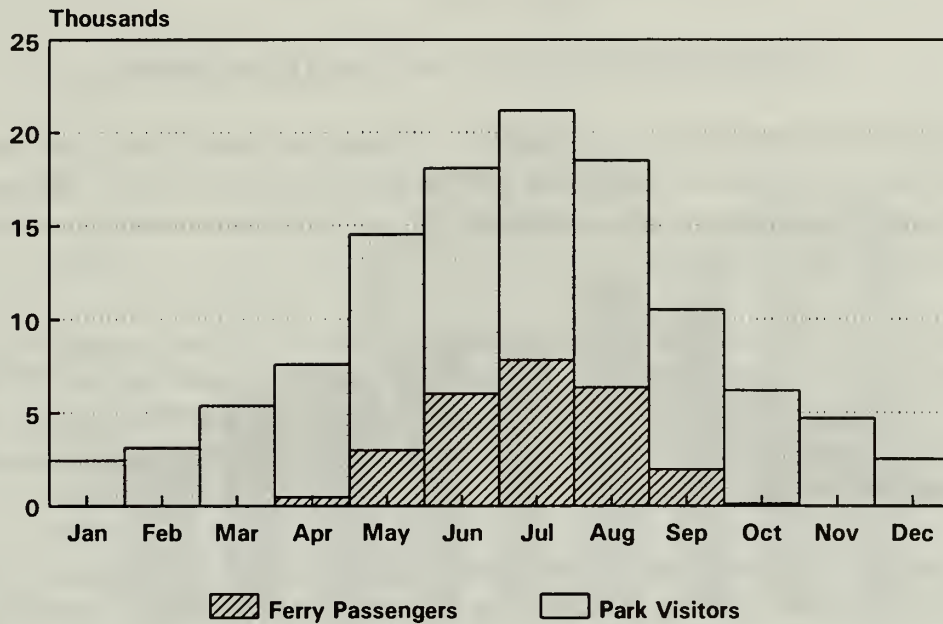


Figure IV-3. Hammocks Beach State Park Monthly Visitation

Interpretation & Education Trends 1987 - 1995

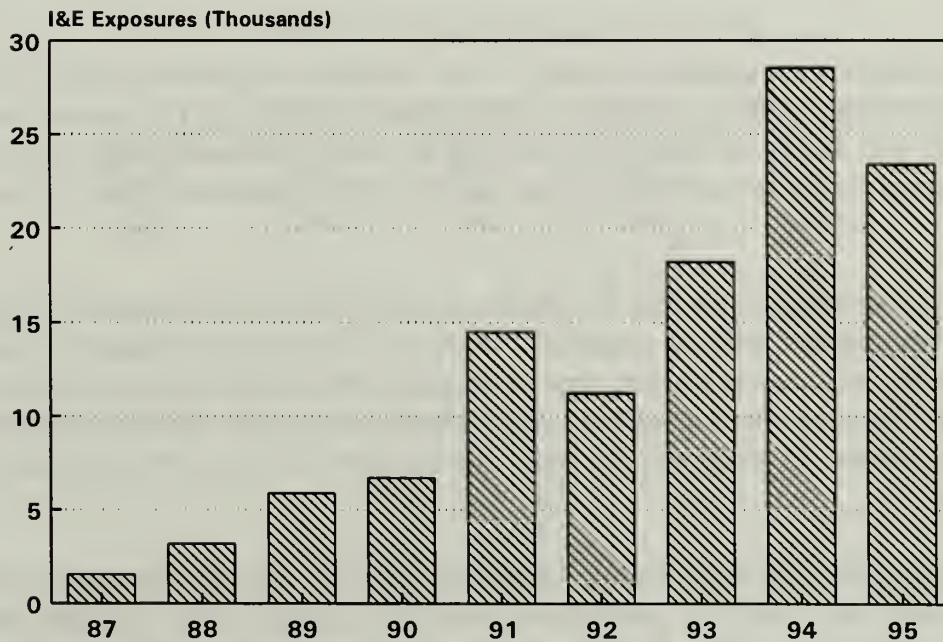


Figure IV-4. Interpretation & Education Trends

Camping Trends

The number of campers at Hammocks Beach had been increasing annually until 1995, when it dropped to 4,554 (Figure IV-5).

VISITOR INFORMATION AND SATISFACTION

The primary source of information about visitors to Hammocks Beach State Park comes from a survey conducted at the park in the summer of 1991 as part of a master's thesis. The survey results reveal more visitor information than is available for most state park units. Four hundred and ninety-three people were surveyed.

Sixty-two percent of visitors were first-time visitors. This is a higher percentage of first-time visitors than at most state park units. Only 22 percent of visitors surveyed in the 1987 Public Area Recreation Visitors Survey (PARVS) of the state parks system were first-time visitors. Hammocks Beach State Park's proximity to the coastal resort areas of Bogue Banks no doubt accounts for the high percentage of first-time visitors.

Thirty-eight percent of visitors were return visitors. Most of these — 26 percent — visited one to three times per season. Seven percent came four to six times annually. Most visitors (73 percent) came in small groups of from two to six persons. Five percent came alone. Most groups (approximately 60 percent) had one or more children under 18 years of age. Most visitors (68 percent) heard about the park from family and friends, an indicator that visitors have been generally pleased with their park experiences and have recommended that others visit. Eleven percent had seen printed advertisements for the park, and 10 percent came because of road signs or road map indicators.

A variety of reasons were given for visiting. They included, in descending order of frequency given: to swim or sun bathe (24 percent); to hike or explore the island (19 percent); to relax (18 percent); to be with family or friends (13 percent); to look for seashells (6 percent); to camp (5 percent); to attend an environmental programs; to see wildlife/birds/sea turtles; to picnic; and to exercise.

While only approximately 20 percent of visitors surveyed attended an interpretive program, those that did were very pleased with the programs. When asked to rate the program they attended on presentation style, information content, time of program and location of program, approximately 66 percent rated the programs as excellent. Approximately 31 percent rated the programs as good. Seventy-four percent of park visitors were not members of any environmental groups or organizations.

Visitors also found the staff to be helpful, courteous, friendly, and knowledgeable (Table IV-1). Visitors to Hammocks Beach are generally well-educated (Figure IV-6). Seventy-eight percent have at least attended some college. The park serves the entire spectrum of income levels (Figure IV-7). It does, however, serve an unusually high percentage of persons with incomes over \$100,000. This is no doubt due to the park's location in a coastal resort area.

Hammocks Beach Camping Trends 1987 - 1995

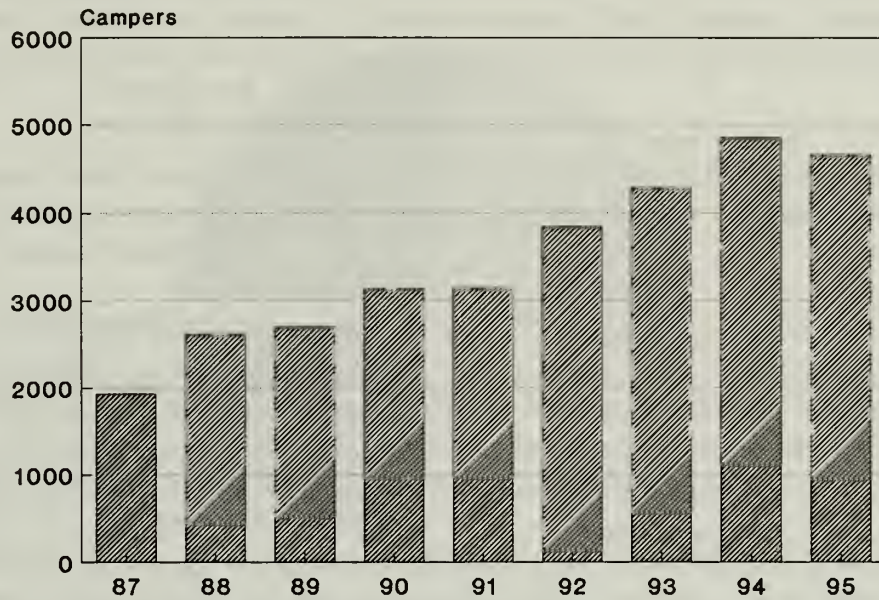


Figure IV-5. Camping Trends

Table IV-1. Staff Ratings by Visitors

	Helpful	Courteous	Friendly	Knowledgeable
Excellent	59%	66%	69%	60%
Good	33%	29%	26%	25%
Fair	3%	2%	2%	3%
Other	5%	3%	3%	12%

Education Level

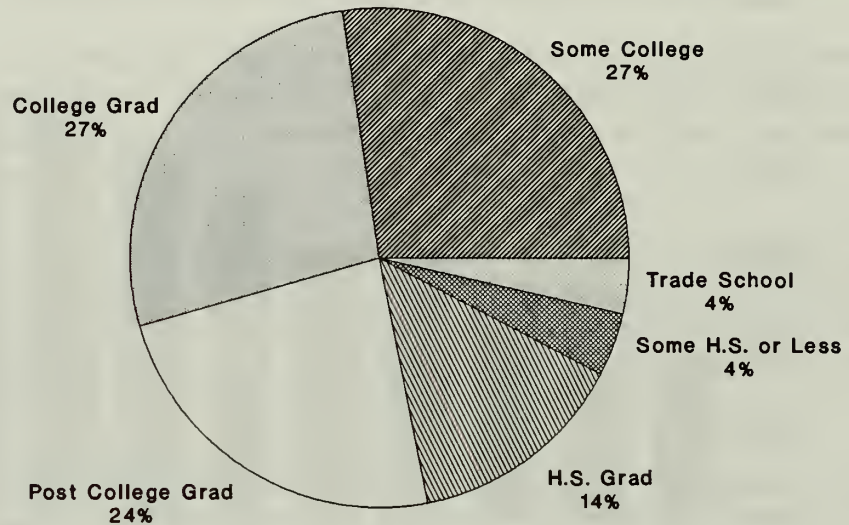


Figure IV-6. Education Level of Park Visitors

Income Distribution

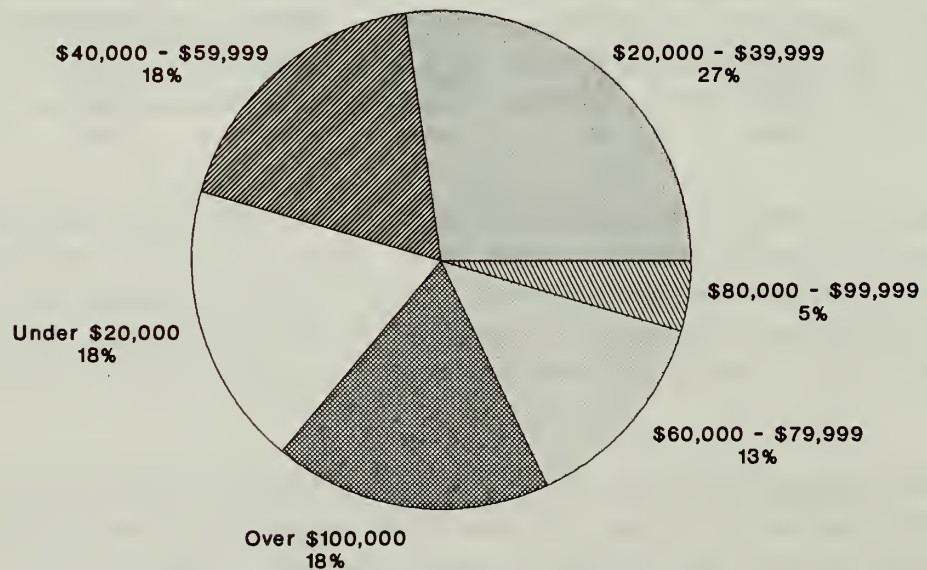


Figure IV-7. Income Distribution of Park Visitors

POPULATION TRENDS

The primary service area of Hammocks Beach State Park includes Onslow County, in which the park is situated, and Carteret and Craven counties. The total population of these counties in 1990 was 284,000 (Figure IV-8), a 26 percent increase over 1980. This rate of growth is expected to slow substantially during the 1990s. From 1990 to 1994, Onslow County's population had dropped 1.8 percent, due primarily to military cutbacks at nearby Camp Lejeune. Craven County and Carteret County have grown 7.7 percent and 3.4 percent respectively during the same four-year period.

The above figures reflect residency only. Because the Bogue Banks area is one of the state's top vacation destinations, the summer population swells Carteret County's population far beyond the number of permanent residents.

According to the Office of State Budget and Management, outside of catastrophic events such as a depression or outbreak of a rapidly spreading, incapacitating disease, the most influential forces affecting the need for state services are the growth and shifts in population. The region's slowing population growth, a trend also predicted for the state as a whole as in-migration from other states slows, will ease pressures on Hammocks Beach due to population growth.

Population shifts in various age segments will also take place. Over the past 10 years, the number of women in their prime childbearing years has declined with the aging of the 1940s baby boomers, and the result has been a decline in births. The number of women in their late teens to middle thirties is projected to change little over the next 20 years. Assuming a stable childbearing rate, the number of children in the newborn to four-year-old category will remain stable.

Public-school-age population (5 to 17) has declined significantly during the past 10 years. It has now reached a plateau that is expected to continue. The college age population (18 to 24) has declined in recent years and is likely to continue its small decline before stabilizing at the end of the century. The percentage of the 18-to-34 population started to decline in 1990.

In contrast, the growth in the middle-aged and elderly population during the next 20 years is a virtual certainty, thanks to the baby boom of the 1940s. The fastest-growing age segment over the next two decades will be the over-85 segment, followed by the 75-to-84 and then the 65-to-74 segments.

Over the past 10 years, the elderly population has become an increasingly vital political force. For the short-term future, it is anticipated that the growing elderly population will confine its demands primarily to health, nursing homes, activities of daily living, and protective services. Numerous surveys have shown these areas to be of primary concern to the elderly.

While shifts in population age groups are particularly significant in school and some social programs, these age-group changes that will be taking place will not have a significant effect on Hammocks Beach State Park over the next five to 10 years.

Population Trends



Figure IV-8. Population Trends

OUTDOOR RECREATION PARTICIPATION IN NORTH CAROLINA

The North Carolina Outdoor Recreation Participation Survey was mailed to 3,100 randomly selected residents in the spring of 1989. Forty-five percent, or 1,399 people, returned completed surveys. Each person receiving the survey was asked to estimate the number of times the members of his household had participated in each of 43 activities. The survey results provide good insight into the current participation of North Carolinians in a wide range of outdoor recreation activities.

The five most popular outdoor recreation activities in North Carolina are walking for pleasure, driving for pleasure, viewing scenery, beach activities, and visiting historical sites. Three out of every four households participated in walking for pleasure at least once in the past 12 months (Table IV-2). In addition to the five most popular activities, over fifty percent of the households that responded participated at least once in the following activities: swimming (in lakes, rivers, or oceans), visiting natural areas, picnicking, attending sports events, visiting zoos, and freshwater fishing.

PRIORITIES OF PUBLIC OUTDOOR RECREATION FUNDING

The North Carolina Outdoor Recreation Survey asked residents a series of questions in order to identify and rank future demand for public outdoor recreation. Future demand was determined by asking them which activities they would have tried more often had adequate facilities been available. Respondents were then asked to rank these activities in order of importance. A scoring system was used assigning each activity a rating of high, moderate or low future demand based on the survey results.

In the second part of the analysis, the respondents' level of support for publicly funded outdoor recreation activities was determined by asking them to identify and rank those activities to which government should give highest priority when spending public money. The same scoring system used to analyze unmet demand was then applied to the survey results, with each activity receiving a high, moderate or low rating in public support for public funding.

In the final part of the needs analysis, the two ratings for each activity were combined to produce a score of one to nine that reflected both future demand and public funding priorities. The activities that ranked high in both future demand and support for public funding received the highest priority in the needs assessment. Support for public funding was given higher priority than expressed demand (Table IV-3). Based on this analysis, many of the activities rated as high and moderate priorities are activities that are currently or could potentially be provided at Hammocks Beach State Park. Some activities rated as public priorities are either illegal in state parks (hunting and target shooting) or not applicable to Hammocks Beach (visiting zoos and freshwater fishing).

Table IV-2. Outdoor recreation activities ranked by popularity.

Rank	Activity	Percentage of Households Participating
1.	Walking for Pleasure	75%
2.	Driving for Pleasure	72
3.	Viewing Scenery	71
4.	Beach Activities	69
5.	Visiting Historical Sites	62
6.	Swimming (in Lakes, Rivers, and Oceans)	54
7.	Visiting Natural Areas	53
8.	Picnicking	52
9.	Attending Sports Events	52
10.	Visiting Zoos	51
11.	Fishing - Freshwater	50
12.	Use of Open Areas	41
13.	Swimming (in Pools)	40
14.	Fishing - Saltwater	38
15.	Attending Outdoor Cultural Events	35
16.	Bicycling for Pleasure	32
17.	Other Winter Sports	31
18.	Camping, Tent or Vehicle	29
19.	Softball and Baseball	28
20.	Hunting	28
21.	Use of Play Equipment	28
22.	Power Boating	26
23.	Trail Hiking	26
24.	Jogging or Running	24
25.	Basketball	24
26.	Nature Study	22
27.	Golf	22
28.	Target Shooting	20
29.	Water Skiing	19
30.	Camping, Primitive	14
31.	Tennis	14
32.	Use Motorcycles, Dirt Bikes, ATV's	13
33.	Use Four Wheel Drive Vehicles	13
34.	Canoeing and Kayaking	13
35.	Horseback Riding	12
36.	Volleyball	12
37.	Downhill Skiing	12
38.	Football	11
39.	Soccer	7
40.	Sailboating	7
41.	Skateboarding	6
42.	Cross Country Skiing	2
43.	Windsurfing	1

Table IV-3. Public Priorities for Future Outdoor Recreation Activities

Activity	Code	Future Demand	Support for Public Funding
Walking for Pleasure	1	High	High
Camping, Tent or Vehicle	1	High	High
Picnicking	1	High	High
Beach Activities	1	High	High
Fishing - Freshwater	1	High	High
Attend Outdoor Cultural Events	1	High	High
Visiting Natural Areas	2	Moderate	High
Use of Play Equipment	2	Moderate	High
Visiting Zoos	2	Moderate	High
Visiting Historical Sites	2	Moderate	High
Bicycling for Pleasure	3	High	Moderate
Swimming (in Pools)	3	High	Moderate
Viewing Scenery	4	Moderate	Moderate
Hunting	4	Moderate	Moderate
Trail Hiking	4	Moderate	Moderate
Use of Open Areas	4	Moderate	Moderate
Target Shooting	4	Moderate	Moderate
Swimming (Lakes, Rivers, Ocean)	4	Moderate	Moderate
Fishing - Saltwater	4	Moderate	Moderate

AREA OUTDOOR RECREATIONAL OPPORTUNITIES

Bogue Banks Beaches (Carteret County)

Nearby Bogue Banks and its beaches Emerald Isle, Indian Beach, Pine Knoll Shores, and Atlantic Beach offer approximately 25 miles of ocean beach. Bogue Banks is one of North Carolina's premier vacation areas, and in the summer season its population swells dramatically.

Cape Lookout National Seashore (Carteret County)

Cape Lookout National Seashore includes both Shackleford Banks and Core Banks, extending approximately 55 miles from near Morehead City to Ocracoke Inlet. The 28,500 acres include few roads and offer uninhabited beaches, superb fishing, shell collecting, and the famous Cape Lookout Lighthouse. The lighthouse, built in 1859, is still operational. Camping is permitted. Cape Lookout is approximately 50 miles from Hammocks Beach via road and ferry.

Cedar Island National Wildlife Refuge (Carteret County)

The 14,482-acre wildlife refuge is located in northeastern Carteret County and is the point of departure for the Ocracoke Ferry.

Croatan National Forest (Carteret, Craven, and Jones Counties)

The Croatan National Forest covers 159,182 acres between New Bern, Swansboro, and Morehead City. The forest has seven recreation areas and offers boating on Great Lake and the Neuse and White Oak rivers, camping, fishing, hiking, picnicking, and swimming in the Neuse River. The forest is also used as state gamelands.

Fort Macon State Park (Carteret County)

Fort Macon State Park is located at Beaufort Inlet on the eastern end of Bogue Banks. The brickwork fort was completed in 1834 to guard Beaufort Inlet. The park offers a nature trail, picnicking, fishing, swimming, and tours of the fort. A bathhouse and refreshment stand are open from June through Labor Day.

Hoffman Forest (Jones and Onslow Counties)

N.C. State University's Hoffman Forest's 78,987 acres lie in Jones and Onslow counties. Approximately 7,000 acres are used as a wildlife refuge; approximately 20,000 acres are state gamelands; and most of the additional acreage is leased to private hunt clubs. The forest is also used for horseback riding.

Theodore Roosevelt Natural Area (Carteret County)

The 265-acre state natural area is located on Bogue Banks at Pine Knoll Shores. A nature trail and observation areas give visitors good views of the coastal environment. The North Carolina Aquarium is adjacent and offers displays of live marine life, workshops for coastal crafts, and educational field trips.

V. SUMMARY OF LAWS GUIDING PARK MANAGEMENT

There are many federal and state statutes, state and federal executive orders, and administrative rules and policies that govern the operation of the state parks system. This chapter includes a brief discussion of the primary legal basis for the existence and operation of the state parks system. It also includes other legal issues of particular concern at Hammocks Beach State Park.

STATE LEGAL MANDATES

North Carolina Constitution

Article XIV, Section 5 of the North Carolina Constitution sets overall policy by broadly defining the conservation and protection of natural resources and the acquisition of such resources as a proper function of government. The amendment reads in part as follows:

It shall be the policy of this State to conserve and protect its lands and waters for the benefit of all its citizenry, and to this end it shall be a proper function of the State of North Carolina and its political subdivision to acquire and preserve park, recreation, and scenic areas, to control and limit the pollution of our air and water, to control excessive noise, and in every other appropriate way to preserve as a part of the common heritage of this state its forests, wetlands, estuaries, beaches, historical sites, open land, and places of beauty.

State Parks Act

The State Parks Act (G.S. 113-44.7 through 113-44.14) sets forth a mission statement for the state parks system. It states that the system functions to preserve and manage representative examples of significant biological, geological, scenic, archaeological, and recreational resources, and that park lands are to be used by the people of the state and their visitors and descendants in order to promote understanding of and pride in the state's natural heritage.

The State Parks Act also calls for development and periodic revisions of a System Plan to achieve the mission and purpose of the state parks system in a reasonable, timely, and cost-efficient manner. The Act describes System Plan components and requires that public participation be a component of plan development and revisions.

The State Parks Act also calls for the classification of park resources and development of general management plans (GMPs) for each park. GMPs are to include a statement of park purpose, an analysis of major resources and facilities, and a statement of management direction.

Powers and Duties of the Department of Environment, Health, and Natural Resources

The Department is authorized to make investigations of the resources of the state and to take such measures as it may deem best suited to promote the conservation and development of such resources. In addition, the Department may care for state forests and parks and other recreational areas now owned, or to be acquired by, the state. (G.S. 113-8)

State Nature and Historic Preserve Dedication Act

The State Nature and Historic Preserve Dedication Act (G.S. 143-260.6) was authorized by Article 14, Section 5 of the North Carolina Constitution. It seeks to ensure that lands and waters acquired and preserved for park, recreational and scenic areas for the purpose of controlling and limiting the pollution of air and water, controlling excessive noise, and in every other appropriate way preserving as a part of the common heritage of the state, continue to be used for those purposes. The State Nature and Historic Preserve Act provides a strong legal tool for protecting lands from incompatible uses. The addition and removal of lands to and from the State Nature and Historic Preserve require a vote of three-fifths of the members of each house of the General Assembly.

All of Hammocks Beach as of April 4, 1989, is in the State Nature and Historic Preserve.

North Carolina Environmental Policy Act of 1971

Recognizing the profound influence that human activity has on the natural environment, the General Assembly passed the Environmental Policy Act *"to assure that an environment of high quality will be maintained for the health and well-being of all..."*

The Act declares that:

It shall be the continuing policy of the State of North Carolina to conserve and protect its natural resources and to create and maintain conditions under which man and nature can exist in productive harmony. Further, it shall be the policy of the State to seek, for all its citizens safe, healthful, productive, and aesthetically pleasing surroundings; to attain the widest possible range of beneficial uses of the environment without degradation, risk to health or safety; and to preserve the important historic and cultural elements of our common inheritance. (G.S. 113A-3)

While there are other General Statutes that concern the state parks system and the environment, the above-described statutes, along with Article XIV, Section 5, of the North Carolina Constitution, largely define the purposes of the state parks system and serve to guide the operation of state park system units.

Coastal Area Management Act

Because of their inherent natural significance in the coastal environment, certain "areas of environmental concern" (AEC) are defined by and protected under the Coastal Area Management Act (CAMA). (G.S.113A-100 et.seq.) Development activities within an AEC require permits, obtained from the N.C. Division of Coastal Management, in addition to any other required state or local permits. Areas of environmental concern defined by the Act include:

- Estuarine systems: sounds, bays tidal waters, inland fishing waters, marshes and shorelines.
- Ocean hazard: beaches, frontal dunes, and inlet islands.
- Public water supply: watersheds and well fields.
- Natural and cultural resources: areas of historic, aesthetic, scientific, or biological significance.

Hammocks Beach State Park includes estuarine systems and ocean hazard AEC's. Questions regarding AEC regulations should be directed to the Division of Coastal Management.

Outstanding Resource Waters

The marsh and waters from Bear Island to the Intracoastal Waterway have been designated as Outstanding Resource Waters (ORW) by the N.C. Environmental Management Commission. The ORW supplemental classification is intended for those special and unique waters with excellent water quality that also demonstrate exceptional state or national recreational or ecological significance. The designation seeks to prevent degradation of water quality primarily by limiting new discharges. The Environmental Management Commission may also take other steps under its power to protect such waters.

Submerged Lands

The power to manage, control, and dispose of submerged lands is vested with the N.C. Department of Administration (GS 146.2). The DOA authorized placement of the Bear Island power transmission cable on unallocated state land.

Archaeological Resources Protection Act

Bear Island contains at least 15 prehistoric archaeological sites, most of which have never been evaluated for significance. Unknown archaeological sites may also exist on the mainland, both within the existing park boundaries and in nearby areas.

A permit is required from the Department of Administration, in consultation with the Department of Cultural Resources, to excavate, remove, damage, or alter any archaeological resource on state lands. Archaeological resources are defined as the remains of past human life or activities that are at least 50 years old and are of archaeological interest (G.S. 70-10).

FEDERAL LAWS

Land and Water Conservation Fund Act of 1965

The federal Land and Water Conservation Fund Act (PL 88-578) offers protection and places restrictions on fund-assisted outdoor recreation areas.

By virtue of receiving Land and Water Conservation Fund (LWCF) grant assistance, most of the state parks system, including most of Hammocks Beach State Park, is subject to LWCF rules and regulations. Property acquired or developed in whole or in part with LWCF assistance cannot be converted to other than public outdoor recreation use without federal approval. A conversion may only take place if approved by the Secretary of the Interior, and only then if replacement property of equal fair market value and reasonably equivalent usefulness and location is made. LWCF regulations apply to the Hammocks Beach State Park acreage as of October, 1986, when the last grant was awarded. LWCF acreage includes all of the island and all of the mainland, except for the last 30 acres acquired in 1988.

LWCF requirements include: programming, operating and maintaining areas in a manner that encourages public participation; maintaining the property so it appears attractive and inviting to the public; maintaining property, facilities and equipment to provide for public safety; keeping facilities, roads, trails and other improvements in reasonable repair throughout their lifetime to prevent undue deterioration and encourage public use; keeping the park and facilities open for use at reasonable hours and times; and making future development meet LWCF rules and regulations. LWCF-assisted sites are periodically inspected by state and federal inspectors to ensure compliance with LWCF requirements.

The Americans With Disabilities Act

Title II of the ADA prohibits discrimination against any "*qualified individual with a disability*."

New Construction and Alterations

Buildings that are constructed or altered by, on behalf of, or for the use of a public entity shall be designed, constructed, or altered to be readily accessible to and usable by individuals with disabilities.

(Section 35.151 of Title II)

Existing Facilities

Structural changes in existing facilities are required only when there is no other feasible way to make the public entity's program accessible.

("Structural changes" include all physical changes to a facility [28 CFR Part 35, Section 35.150, Title II of the ADA Section-by-Section Analysis].)

When alterations affect access to a primary function of a facility, the entity shall also make alterations to the path of travel to the area and bathrooms, public telephones, and drinking fountains serving the altered area.

Programs and Services

...each service, program, or activity conducted by a public entity, when viewed in its entirety, be readily accessible to and usable by individuals with disabilities.

(Title II, Section 35.150)

This includes, but is not limited to, the provision of auxiliary aids and services, including services and devices for effective communication where necessary to afford persons with disabilities an equal opportunity to participate in and enjoy the benefits of a service, program, or activity conducted by a public entity.

Signs

A public entity must ensure that persons with impaired vision and hearing can obtain information regarding the location of accessible services, activities, and facilities. Signs must be provided at all inaccessible entrances to each facility directing users to an accessible entrance or to a location where information can be obtained about accessible facilities. The international symbol for accessibility must be used at each accessible entrance to a facility. (Title II, Section 35.163)

Clean Water Act

Hammocks Beach State Park has sensitive wetland areas that receive some protection from Section 404 of the federal Clean Water Act. The Act prohibits the discharge of dredge or fill materials into waters, including wetlands, without a permit from the U.S. Army Corps of Engineers. Activities in wetlands for which permits may be required include but are not limited to: placement of fill material; ditching activities; land clearing involving relocation of soil material; land leveling; most road construction; and dam construction (33 USC 1344). The Division will avoid undertaking construction located in wetlands unless there is no practical alternative and all practical measures are taken to minimize harm to the wetland.

River and Harbors Act of 1899

The navigable waters around Hammocks Beach State Park are subject to Section 10 of the federal River and Harbors Act of 1899 (33 USC 403). This Act prohibits the obstruction or alteration of navigable waters without a permit from the Corps of Engineers. Permit review considerations, besides navigation, include those things that would be of general public interest, such as activities affecting fish and wildlife, conservation, pollution, and aesthetics.

Ferry Operation and Inspection

The ferries at Hammocks Beach are subject to federal regulations that govern their operation (46 CFR 166-199). These regulations, administered by the U.S. Coast Guard, include ferry inspections, dry dock inspections, safety inspections, stability criteria, drug testing, and operator licensing.

VI. NATURAL AND CULTURAL RESOURCE MANAGEMENT

NATURAL RESOURCE MANAGEMENT POLICY

The Division of Parks and Recreation's approach to natural resource management is directed by the North Carolina Constitution and the State Parks Act, both of which require the prudent management of natural resources. The constitution sets the overall policy by broadly defining the conservation and protection of natural resources and the acquisition of such resources as a proper function of government. The State Parks Act states that unique archaeological, geological, biological, scenic and recreational resources are a part of the heritage of the people that "*...should be preserved and managed by those people for their use and for the use of their visitors and descendants.*"

The North Carolina state parks system plays an important role in maintaining, rehabilitating and perpetuating the state's natural heritage. The natural resources of the state parks system are: high quality, rare or representative examples of natural communities; native plants and animals; geological features and landforms; water resources; and the natural processes that affect these resources. The primary objective in natural resource management will be the protection of natural resources for their inherent integrity and for appropriate types of enjoyment while ensuring their availability for future generations.

It is the Division's policy that natural resources will be managed by allowing natural environments to evolve through natural processes with minimal human influence. Natural resource management will not attempt solely to preserve individual species or processes; rather, it will attempt to maintain all the components and processes of a park's naturally evolving ecosystems. When intervention is necessary, direct or secondary effects on park resources will be minimized to the greatest extent possible. Intervention of natural processes may occur:

- 1) to correct or compensate for the previous human disruption of natural processes;
- 2) to protect, restore or enhance rare species and natural communities;
- 3) to protect, restore or enhance significant archaeological resources;
- 4) to construct, maintain, improve or protect park facilities; and,
- 5) to prevent danger to human health or safety around park facilities.

All park facilities will be designed, constructed and maintained to avoid adverse impacts to high quality natural communities, rare plant and animal species, major archaeological sites and other significant natural and cultural resources.

NATURAL COMMUNITIES

Much of the floristic information in this document is based on J.A. Bland's 1990 M.S. thesis (UNC-Wilmington) on Bear Island's geomorphology and vegetation. Additional information was taken from R.L. Wilbur and E.O. Beal's 1970 unpublished checklist of species for Bear Island, and T.J. Dickerson, Jr.'s 1978 M.S. thesis (N.C. State University) on Bear Island's flora and natural communities. The community descriptions follow the *Classification of the Natural Communities of North Carolina: Third Approximation* (Mike Schafale and Alan Weakley, 1990).

Information on the park's mammalian fauna was taken from C.A. Murray's 1991 report conducted as a part of the State of North Carolina's Fellowship Program and his 1991 M.S. thesis (UNC-Wilmington). Herpetological information came from M.E. Cabik's 1991 M.S. thesis (Duke University).

Dune Grass

This community type is abundant on Bear Island and is dominated by perennial grasses, particularly sea oats (*Uniola paniculata*). American beach grass (*Ammophila breviligulata*) was introduced on the island in the late 1960s and occurs commonly across the island. Running beach grass (*Panicum amarum*) and sea elder (*Iva imbricata*) are also common on the foredunes. The vegetation ranges from very sparse to very dense in this community type, which includes extensive areas of largely barren dunes whose topography and degree of vegetation are strongly influenced by prevailing wind and weather patterns.

Maritime Dry Grassland

This community type occurs in small pockets on and between low stable dunes. As with all barrier island plant communities, this community type is dynamic and is overwashed by the ocean in severe storms. Overwash and deposits may temporarily bury the vegetation, but the dominant species are well adapted and usually recover quickly from such natural disturbances. These communities are not particularly rare, but large, high quality examples are limited.

Common species include saltmeadow cordgrass (*Spartina patens*), seaside goldenrod (*Solidago sempervirens*), dune sandspur (*Cenchrus tribuloides*), common foxtail grass (*Setaria geniculata*), and seabeach sandmat (*Chamaesyce polygonifolia*). Occasional shrubs include wax-myrtle (*Myrica cerifera*) and yaupon (*Ilex vomitoria*).

Maritime Evergreen Forest

Approximately 32 acres of Maritime Evergreen Forest occur on Bear Island. This is a significant decrease from estimates based on information from 1938 and 1960. Much of the loss over the years may be attributed to active dunes that are burying parts of the forest.

This community type usually occurs on old, stabilized dunes and flats in areas that are protected from salt water flooding and heavy salt spray. The present forest is in relatively small pockets in the northeast section of the island, with smaller patches in between.

Characteristic canopy species for the Maritime Evergreen Forest on the island include laurel oak (probably sand laurel oak, *Quercus hemisphaerica*, rather than *Q. laurifolia*), live oak (*Q. virginiana*), loblolly pine (*Pinus taeda*), and yaupon. The understory has abundant vine species, including poison ivy (*Toxicodendron radicans*), Carolina jessamine (*Gelsemium sempervirens*), Carolina supplejack (*Berchemia scandens*), saw greenbriar (*Smilax bona-nox*), Virginia creeper (*Parthenocissus quinquefolia*), and muscadine grape (*Vitis rotundifolia*). The community grades into Maritime Shrub in many areas.

Maritime Shrub

This community type usually occurs on old, stabilized dunes and flats in areas that are protected from salt water flooding and heavy salt spray. Bear Island supports approximately 178 acres of Maritime Shrub. Dominants include wax-myrtle, yaupon, swamp willow (*Salix caroliniana*), groundsel-tree (*Baccharis halimifolia*), Virginia red cedar (*Juniperus virginiana*), and stunted live oak. Northern bayberry (*Myrica pensylvanica*), which is non-native, has been transplanted on the island and has become established; it may show up in this community type. A notable species present in this community is longleaf pine (*Pinus palustris*). As with the Maritime Evergreen Forest, some areas of this community are being buried by active dunes.

Maritime Swamp Forest

This community type usually occurs in well protected swales, on the edges of relict dunes, and along the edges of freshwater sounds. The example on Bear Island is small (dimensions not known), and occurs in association with the island's Maritime Evergreen Forest community. Characteristic hydric species include cottongrass bulrush (*Scirpus cyperinus*), marsh pennywort (*Hydrocotyle umbellata*), and marsh fleabane (*Pluchea foetida*). The canopy is dominated by sweetgum (*Liquidambar styraciflua*), water oak (*Q. nigra*), and black gum (*Nyssa sylvatica*).

Maritime Wet Grassland

This community type occurs on dune swales, old overwash terraces, sand-filled marshes, and sand flats where the water table is normally just beneath the surface. Bear Island supports a number of small pockets of this community type, generally less than two acres in size.

The vegetation is usually dense and herbaceous, with a mixture of wetland and mesic species making for high diversity. Characteristic species include duneslack muhly (*Muhlenbergia filipes*), marsh sedge (*Fimbristylis spadicea*), three-square (*Scirpus americanus*), dune pennywort (*Hydrocotyle bonariensis*), and saltmeadow cordgrass.

Salt Flat

Examples of this community type are frequently small, and often occur in association with salt marshes. A small Salt Flat is located on the eastern end of the island at Bogue Inlet, which has been heavily eroded by recent severe storms, causing changes in the area's community structure. Characteristic species include Virginia saltwort (*Salicornia virginica*), sea lavender (*Limonium carolinianum*), salt grass (*Distichlis spicata*), and marsh sabatia (*Sabatia stellaris*). The community grades into Salt Marsh.

Salt Marsh

Excellent examples of this community type are scattered between the island and the mainland. Bland (1990) refers to the community as tidal marsh and reports that salinity varies from brackish to full strength seawater. The community is dominated by saltmarsh cordgrass, with glassworts (*Salicornia europea* and *S. virginica*), sea ox-eye, and sea lavender. Cattails (*Typha latifolia* and *T. angustifolia*) are present in the more brackish areas.

Salt Shrub

This community type is frequently lumped with marshes, but unlike marshes, it does not receive regular tidal flooding. Small pockets of this community are scattered on the island's sound side, and are often difficult to distinguish from the Maritime Shrub communities. These communities are generally dominated by shrub species such as bigleaf marsh elder (*Iva frutescens*), groundsel-tree, wax-myrtle, seaside oxeye (*Borrchia frutescens*), and Virginia red cedar.

Upper Beach

This community is represented on the island's ocean shores and the inlets, in the zone that is above mean high tide but is inundated by high spring tides and storm tides. Annuals are prevalent rather than the perennials that dominate in the Dune Grass community. Seabeach amaranth, seabeach sandmat, seabeach orach (*Atriplex arenaria*), and sea rocket (*Cakile edentula*) are characteristic species. Perennials, such as sea oats and shoreline sea-purslane (*Sesuvium portulacastrum*), also occur in smaller numbers.

NATURAL HERITAGE PROGRAM ELEMENT OCCURRENCES

Seabeach Amaranth (*Amaranthus pumilus*)

Seabeach amaranth has been designated as a Threatened species at both the state and federal levels, meaning that it is likely to become an Endangered species within the foreseeable future throughout all or a significant portion of its range. A large population (over 400 plants in 1992) occurs on the southwestern quarter of the island in the Upper Beach community. Since seabeach amaranth is an annual and a primary successional species, the population's location and size varies, sometimes widely, with beach accumulation and erosion. Severe storm erosion appears to have considerably reduced the species' occurrence on the eastern and northern portions of the island. There has been no evidence of grazing by insects; however, it appears deer may be grazing on the plants.

Four-angled Flatsedge (*Cyperus tetragonus*)

This species has been designated by the NHP as Significantly Rare; such species are considered to be very rare in North Carolina and generally have 1-20 populations statewide. Statewide, the species has been documented in only five counties.

This species has been previously documented in maritime forest and marsh at the southern end of the island, but the most recent confirmed record dates from September 1961. Bland's survey in 1990 did not find the species. General habitat for the species is listed as maritime forests and barrier island grasslands.

Winged Seedbox (*Ludwigia alata*)

This species is designated as Significantly Rare. It is a perennial and has been documented from interdune ponds and marshes in nine counties, including Onslow. The most recent confirmed park record dates from August 1967, when it was found on the western quarter of the island in a well-vegetated swale.

Moundlily Yucca (*Yucca gloriosa*)

This species has been designated as Significantly Rare. Statewide, natural populations of this species occur in only seven counties. The most recent park record for this species is from September 1992, when one plant, in flower, was located on the southeastern corner of the island. Severe erosion from storms in recent years has put this individual in jeopardy, and it could be lost if a severe storm hits during the winter storm season. According to park staff, other individuals and small groups of plants are scattered over the island.

Loggerhead Turtle (*Caretta caretta*)

This species has been designated as Threatened at both the state and federal levels. Loggerhead nests are a regular occurrence on area beaches, and Bear Island is reported as one of the most active nesting sites along the North Carolina coast. Thus, the park is an invaluable asset to this species' survival. Nesting has been monitored since 1975, when the N.C. Wildlife Resources (WRC) began using overflights to record crawls. Daily beach patrols were started in 1983, and the park now has a well established monitoring program that locates and monitors all nests.

Leatherback Sea Turtle (*Dermochelys coriacea*)

This species has been designated as Endangered at both the state and federal levels. Records indicate one leatherback sighting on Bear Island in 1987, but it did not nest. This species is rare throughout its range, and a 1966 record from Cape Lookout is the only known nesting record for North Carolina.

Green Turtle (*Chelonia mydas*)

This sea turtle has been designated as Threatened at both the state and federal levels. Nest records for Bear Island are rare; park staff report that no nests have been seen for at least ten years. The NHP has records of green turtle nesting at nearby Onslow Beach in 1980, 1985, and 1987, so the possibility of nesting recurring on Bear Island is still strong.

Diamondback Terrapin (*Malaclemys terrapin terrapin*)

This reptile has been designated by the WRC as a Special Concern species. It is common in the marshes on the island's mainland side, and nests are frequently observed near the ferry dock every year. Nests are not monitored, but park staff report that diamondback terrapins are regularly observed on the sound side of the island.

Black Skimmer (*Rynchops niger*)

This bird has been designated by the WRC as a Special Concern species (for breeding sites only). The black skimmer is a common visitor throughout the year on Bear Island, and is frequently seen foraging off the beach. The species nests on bare sand flats on the beaches of barrier islands; however, park staff indicate that it is an infrequent nester on Bear Island. No nests have been documented since 1991, when a single nesting pair was observed. NHP staff report that human disturbance and storm overwash may adversely affect nesting.

Phaon Crescent (*Phyciodes phaon*)

This butterfly species has been designated by the NHP as Significantly Rare. It has been reported from a disturbed area near the bathhouse on Bear Island. Park staff report that the species' host plant, cape weed (*Phyla nodiflora* var. *canescens*), is common on the island. This indicates a potential for a significant population of this butterfly in the park. Additional inventory for this and other invertebrates is needed in the park.

REGISTERED NATURAL HERITAGE AREAS

Hammocks Beach State Park Registered Natural Heritage Area

This registered area encompasses 870 acres of Bear Island; it includes all of the island with the exception of approximately 22 acres that include the ferry dock, road, bathhouse, maintenance area, and barracks. Bear Island is one of North Carolina's last undeveloped barrier islands, and it serves as an excellent example of how coastal forces shape these ecosystems. The central core of the island consists of large, bare to sparsely vegetated, mobile sand sheets; the largest dunes on the island's eastern side reach elevations between 30 and 60 feet.

With the exceptions of small-scale efforts at dune stabilization in 1960 following Hurricane Donna and the introduction of several exotic species, the island has remained essentially undisturbed, and its natural communities and the processes affecting them are intact. Dunes, blowouts, drifts, scoured banks, sand cliffs, gentle slopes, and a variety of natural community types are all numerous across the island. The maritime forest, though not particularly well developed, provides an excellent example of how forest and dune ecosystems interact on barrier islands. The NHP has numerous records for rare species across the island, which is most noted for its role as an important nesting site for the Atlantic loggerhead sea turtle. Rare bird species known to visit the island include Bald Eagles (*Haliaeetus leucocephalus*), Peregrine Falcons (*Falco peregrinus*), Brown Pelicans (*Pelecanus occidentalis*), Northern Harriers (*Circus cyaneus*), Sharp-Shinned Hawks (*Accipiter striatus*), Bank Swallows (*Riparia riparia*), and Snowy Egrets (*Egretta thula*).

The greatest threats to the area are from human and vehicular traffic. Only park vehicles are allowed on the island, and their traffic is restricted. However, trampling around the bathhouse, campsites, frontal dunes, and other areas by park visitors is apparent and is being monitored by park staff. Erosion by recent storms and the lack of subsequent natural replenishment have taken their toll on the east (Bogue Inlet) end of the island, including the apparent loss of the seabeach amaranth population in that area and the potential loss of moundlily yucca.

Exotic plant species known to have been introduced to the island are American beach grass, false indigo (*Amorpha fruticosa*), shore juniper (*Juniperus conferta*), indigofera (*Indigofera pseudotinctoria*), Japanese honeysuckle (*Lonicera japonica*), northern bayberry (*Myrica pensylvanica*), and Japanese black pine (*Pinus thunbergiana*). With the exceptions of American beach grass, which is now widespread across the island, and northern bayberry, which has formed dense thickets around the bathhouse, none of these species has thrived.

POTENTIAL ADDITIONS TO THE REGISTERED NATURAL HERITAGE AREA

The Salt Marsh community, as well as other communities on the mainland side of the island may be eligible for registry, whether they are included in the park or not. These natural communities are all of high quality and support large bird populations. These populations include several species tracked by the NHP, as well as other animals such as the diamondback terrapin.

NHP staff have also suggested that registry include the area between the Intracoastal Waterway and Bear Island. This would include Hawkins Island and Huggins Island and would protect examples of Maritime Evergreen Forest and Maritime Swamp Forest communities. Both of these islands are considered a high priority for protection by the NHP.

NATURAL AND CULTURAL RESOURCE MANAGEMENT ISSUES

Cultural Resources

Significant archaeological resources have been documented from both the mainland and Bear Island. A large Woodland Period (approximately 550 A.D.) shell midden was identified in 1972 less than 50 yards north of the mainland parking area. It is believed to have been a small, but intensely used site. Excavations indicate that the site forms a discontinuous arc-shaped midden that generally parallels the park shoreline. The site's size has been estimated at 6 acres. Numerous ceramic shards have been recovered from the site, and excavations established the presence of intact subsurface features, including post molds, storage pits, and a hearth. Several shell middens of unknown age have also been discovered on Bear Island. The Bear Island middens, which are well away from visitor use areas and proposed development sites, are not considered to be in any danger.

The State Historic Preservation Office has classified the mainland site as significant; any ground disturbing activities must be preceded by archaeological testing and, if necessary, mitigation. Although the archaeological site has not been fully explored, depending on land acquisition and

facilities placement, the park's master plan could affect this area. In order to avoid problems in this area, the Division will have the site fully investigated and delineated prior to the initiation of significant capital improvements in the area.

Sea Turtle Monitoring Program

The park's sea turtle monitoring program has been in place for over twenty years and has provided excellent long term data, particularly for the loggerhead sea turtle, which is the species most likely to nest on Bear Island. Data from 1975 through 1995 showed a high of 66 nests in 1966 and a low of eight nests in 1981. With the exception of 1995, when only 57% of the eggs hatched, hatch rates have hovered between 75-85% since 1991. Nest totals have been declining over the last five years. There were 43 nests in 1991; 42 in 1992; 15 in 1993; 34 in 1994; and just 12 in 1995. Although the cause of the particularly sharp decrease in 1995 is unknown, Bear Island's case is not unique. Counts of confirmed loggerhead nests were down at all North Carolina nesting sites in 1995. Researchers have speculated that the decline may be due to increased off-shore military operations, which disrupted migratory activity. Intense winter storms, which produced prominent erosion scarps on the island's seaward side, may also have affected the turtles' ability to reach nesting sites.

Deer Populations on Bear Island

White-tailed deer frequently swim to Bear Island from the mainland, and although there has not been any scientific study of the island's herd, the park staff have become concerned that the population may be getting too large for the island's carrying capacity. Browse levels, digging for roots, and the frequency of sightings all appear to be increasing. A herd as large as 25 has been seen in the island's marsh areas.

Park staff have consulted Dr. David Webster, a biologist at UNC-Wilmington, and he has indicated that deer will dig for roots when other food supplies are limited. He also indicated that population levels are usually self-regulating on barrier islands and that they eventually reach levels that can be supported by the island's resources.

The Division does not have detailed information regarding either the size and impacts of the current population, or the island's biological carrying capacity. As a first step, the herd's health needs to be assessed by wildlife biologists. This will provide baseline data and should be followed by a long term monitoring program to study deer use and impacts. Research and data are needed on all of these topics before any meaningful management options are proposed or implemented.

Raccoon Activity on Bear Island

Park staff have become concerned in the last year over aggressive raccoons, especially in the camping sites. Campers have reported raccoons appearing in groups scavenging for food, and on several occasions, these animals have come into the camp sites and taken food while the sites were occupied.

The park's staff are concerned over visitor safety and the potential for rabies infections. They have instituted an information program warning visitors not to approach or feed the animals and to keep

a clean camp site at all times. All trash cans on the island are emptied each day. An additional safeguard would be to install animal-proof food lockers like those used in National Park Service campgrounds.

If visitors will follow the warnings, then this issue may resolve itself. However, if the raccoons become unmanageable or present an unacceptable threat to visitor safety, then they should be removed. Because of the statewide rabies issue, problem raccoons that do not respond to other management efforts cannot be relocated off the park; the only other control option is to kill them. If a decision is made to remove any animals, then the park staff should contact the Wildlife Resources Commission for assistance.

Military Aircraft

Hammocks Beach is located just east of the Marine Corps Air Station at Camp LeJeune, and aircraft activity over the park is nearly constant. Aircraft from Cherry Point and Bogue Airfield also use this airspace and frequently fly the length of Bear Island at altitudes as low as 300 feet on bombing approach runs to nearby Brown's Island, which is located just south of Bear Island. In addition to disrupting I&E programs, startling and annoying visitors, and disturbing wildlife, Bear Island has been bombed and park visitors have had spent machine gun shell casings fall around them as pilots tested their weapons while over the park.

The Division has made repeated attempts to have the park recognized as a noise sensitive area, and has requested that all flights over Bear Island be limited to 3,000 feet above ground level (agl). The military has been unresponsive to these requests; in response to our concerns over noise related land use conversions under the provisions of the Federal Land and Water Conservation Act, the Marine Corps has replied that special use airspace approved prior to 1965 has been grandfathered and is subject only to Federal Aviation Administration (FAA) regulations. The FAA limits high speed overflights in the area to 1,200 feet agl; low speed aircraft are allowed to fly as low as 500 feet agl. These regulations are routinely ignored by all types of aircraft, and park staff routinely cite instances of jet and helicopter aircraft flying so low that equipment and crew members are clearly visible.

Based on past history, it appears unlikely that the Marine Corps will do anything to alleviate noise impacts at Bear Island. However, military airspace traffic has become a statewide issue, and a State/Military Airspace Task Force has been assembled to address the state's concerns over military airspace use. State government representatives on the task force have requested that all military training routes, particularly those in high use areas like Hammocks Beach, undergo a systematic review. These reviews will include requests for realignments or other modifications that will reduce conflicts. The goal is to produce cooperative agreements that address airspace use and the surrounding land use. Park staff should document instances of low-flying aircraft by recording the time, date, type of aircraft, and any other information that might prove helpful for identification purposes.

Updated Natural Resources Inventories

Biological Inventory

Hammocks Beach has received a number of high quality academic surveys. However, several of these studies were done in limited time periods, so important species may have been missed. As has been documented by several investigators, the island's dynamic ecosystems are constantly altering total species composition as well as the location and size of natural communities; follow-up inventory and monitoring of rare species and communities are needed. A thorough inventory of invertebrates, particularly insects, is needed, and a detailed survey and monitoring program for birds needs to be established.

Geology and Hydrology

Bear Island offers an opportunity for the long-term study of barrier island geomorphology in a relatively undisturbed condition. At a minimum, aerial photographs need to be assessed on an annual basis to assess the island's morphology, dune migration, and vegetation patterns. Regular monitoring of the park's ground water to assess long-term changes is also needed.

Resource Management Plan

A comprehensive, park-specific resource management plan addressing these and other issues needs to be developed. This plan should include detailed actions whose implementation will prevent or correct resource threats or damage. The addition of district resource management specialists would facilitate the development of this plan.

VII. PHYSICAL PLANT INVENTORY

FACILITY INVENTORY AND INSPECTION PROGRAM

The buildings in state parks are needed for park operations and visitor services. These buildings and facilities are essential components of protecting the public's health and safety. They include facilities providing safe drinking water, restrooms, and electricity, as well as recreation facilities such as bathhouses, group camps, and cabins. Without proper maintenance, these facilities are, at best, a disservice to the citizens who use them, and at worst, potentially harmful.

The Facility Inventory and Inspection Program (FIIP) is a computer-based system used to track the condition, maintenance needs, and repair costs of every building in the state parks system. A principal objective of FIIP is to identify deficiencies that may affect health, fire, or life safety. Other objectives are to identify accessibility deficiencies and other significant maintenance-related deficiencies.

During a field evaluation of each facility, deficiencies are given priority ratings of critical, serious, or minor. The deficiencies are classified in nine basic categories: site (the grounds and walkways surrounding the building); exterior envelope; interior envelope; fire/life safety; handicapped accessibility; public health; heating/ventilation/air conditioning (HVAC); plumbing; and electrical.

The field evaluation begins with an inventory of all structures in the park. The results of the inventory are presented using the building name and state property numbers as identification. Next, the types of repairs and repair costs are listed for each building. Finally, the cost summary for the park is given using the nine basic categories of repairs (e.g. exterior envelope) and the three levels of deficiencies (critical, serious, and minor).

HAMMOCKS BEACH STATE PARK BUILDING INVENTORY

<u>CODE</u>	<u>BUILDING NAME</u>	<u>LOCATION</u>	<u>IN USE</u>
014001	Park Office	Mainland	Yes
014002	Garage/Storage	Mainland	Yes
014003	Restroom/Shelter	Mainland	Yes
014004	Shelter	Bear Island	Yes
014005	Personnel Quarters	Bear Island	Yes
014006	Garage/Storage	Bear Island	Yes
014007	Exhibit Building	Bear Island	Yes
014008	Power Room	Bear Island	Yes
014009	Restrooms Under Bathhouse	Bear Island	Yes
014010	Bath House	Bear Island	Yes
014011	Picnic Shelter	Bear Island	Yes
014012	Picnic Shelter	Bear Island	Yes
014013	Picnic Shelter	Bear Island	Yes

014014	Picnic Shelter	Bear Island	Yes
014015	Picnic Shelter	Bear Island	Yes
014016	Picnic Shelter	Bear Island	Yes
014028	Boat Storage Shed	Mainland	Yes

STATUS OF FACILITIES

Facilities at Hammock Beach include two groups of buildings: operations and maintenance buildings on the mainland, and an array of structures on Bear Island. The majority of buildings are in good condition; however, there are six structures that require work costing over \$10,000 each. There is presently a bond project in the design stage that consists of repair and renovation to the maintenance area on the mainland. Since the scope of the project has not yet been determined, some work may appear in this report that will be included in the bond project. The existing Boat Storage Shed (014-028) is to be demolished as part of this project.

Asbestos is a serious problem in buildings at Hammocks Beach. Cementitious asbestos is used as siding on several structures and for walls and ceilings in the bathhouse shower areas. Asbestos of this type is not hazardous unless it breaks, releasing friable material. However, panels are beginning to crack, and the screws holding panels in place are rusting badly. Replacing these fasteners could possibly delay major expenditures, but this would itself require extreme care. The Department of Insurance has suggested covering existing siding with spray foam insulation, then with vinyl siding. Doing so would delay removal of the siding until the buildings in question are demolished. This plan has been used to estimate costs shown below. This solution is not suggested for the bathhouse since it is scheduled to be replaced.

Handicapped Accessibility

None of the public buildings on the mainland are accessible. Access to the island itself is difficult, and none of the buildings there are accessible. Due to time limitations, a full survey was not performed. Only the accessibility work that was already in the FIIP database has been included. Considerably more work will be required to achieve accessibility than is included in the following cost estimates.

Building Repair and Demolition Estimates

BLDG. NUMBER	BUILDING NAME/WORK NEEDED	DEMOLITION COST	REPAIR COST
MAINLAND FACILITIES			
014-001	Office		\$20,565
	Add fire detection system with off-site dialer		9,000
	Add accessible ramp to front door		2,250
	Replace door locks		315
	Replace vinyl floor covering		9,000
014-002	Garage/Storage		\$13,704
	Add fire detection system with off-site dialer		9,000
	Add dust collection system		3,999
	Add emergency exit light		375
	Replace door and lock		330

BLDG. NUMBER	BUILDING NAME/WORK NEEDED	DEMOLITION COST	REPAIR COST
014-003	Restroom/Shelter		\$17,004
	Add ramp		909
	Provide accessible toilet rooms		6,066
	Replace damaged pilings		3,600
	Replace roof decking and shingles		5,850
	Replace vents		720
	Old Camp Buildings (not numbered)	\$7,000	
	BEAR ISLAND FACILITIES		
014-004	Shelter		\$7,800
	Add ramp		
014-005	Personnel Quarters		\$14,715
	Cover asbestos siding		5,250
	Replace vent		150
	Replace doors and windows		9,315
014-006	Garage/Storage		\$11,760
	Cover asbestos siding		6,300
	Replace doors and windows		3,210
	Replace panel box from power building		2,250
014-007	Exhibit Building		\$68,025
	Add accessible drinking fountain		1,650
	Replace wall units with heat pump system		37,500
	Replace doors and windows		2,190
	Add carpeting in exhibit hall and lecture room		26,250
	Add projection system switches		435
014-008	Power Room	\$600	
	Demolish building		
014-009	Restrooms beneath Bathhouse		\$3,552
	Replace doors		1,440
	Replace lavatories with counter mounted units		2,112
014-010	Bathhouse		\$11,280
	Install fire detection with off-site dialer		9,000
	Replace doors		2,280
014-011	Picnic Shelter		\$480
	Replace roofing		
014-012	Picnic Shelter		\$480
	Replace roofing		
014-013	Picnic Shelter		\$480
	Replace roofing		
014-014	Picnic Shelter		\$480
	Replace roofing		
014-015	Picnic Shelter		\$480
	Replace roofing		
014-016	Picnic Shelter		\$480
	Replace roofing		
	Totals	\$7,600	\$171,286

FACILITY REPAIR NEEDS COST SUMMARY

DEFICIENCY CATEGORY	PRIORITY 1 (CRITICAL)	PRIORITY 2 (SERIOUS)	PRIORITY 3 (MINOR)	CATEGORY SUBTOTAL
Site	7,600	0	0	7,600
Exterior Envelope	11,700	22,836	9,153	43,689
Interior Envelope	0	9,000	26,250	35,250
Fire/Life Safety	27,000	375	0	27,375
Handicapped Access	18,676	0	0	18,676
Public Health	0	0	0	0
HVAC	0	41,499	0	41,499
Plumbing/Utility	0	2,112	0	2,112
Electrical	0	2,250	435	2,685
TOTALS:	64,976	78,072	35,838	178,886

Deficiencies that are a fire threat or threat to life, safety, or the health of an individual are considered to be "critical." A "serious" deficiency is one that is not considered a fire threat or threat to life or safety, but which could cause further damage to the structure if left uncorrected. This category usually includes building code violations. "Minor" deficiencies are those requiring general maintenance and repair.

ROAD AND UTILITY INVENTORY AND INSPECTION

The following tables give a brief description of Hammocks Beach State Park's roads and parking areas, utilities, and their current conditions, repair needs, and estimated repair costs. The information comes from the Institute for Transportation, Research, and Education's (ITRE) study on roads, original construction drawings, past experience with construction projects at the park, and a recent inspection of the park facilities. The ITRE study, conducted in March of 1990, identified .77 miles of paved road and 5,330 square yards of parking lot.

Roads Inventory

ROAD NAME/ IDENTIFIER	DESCRIPTION	CURRENT CONDITIONS	REPAIR NEEDS	REPAIR COST
<u>Island</u>				
Main Road	Main road from island ferry to bath-house .50 miles of 10' wide pavement. Surface is of mat and seal coat with brown river rock overlay. Base course 4 to 6 inch ABC.	Repaved with mat and seal coat in 1994 by NCDOT forces. Good	Sand removal on certain areas and routine patching. Long term - resurfacing with I-2 asphalt or colored concrete.	\$1,000 to \$1,500 yearly
Maintenance Road	Road to maintenance shop and exhibit building .08 miles of 10' wide pavement.	Repaved with mat and seal coat in 1994 by NCDOT forces. Good	Sand removal on certain areas. Repatching areas, routine patching, long term - resurface with I-2 asphalt.	\$100/year
Barracks Road	Road to barracks off of maintenance road. .07 miles of 10' wide pavement.	Repaved with mat and seal coat in 1994 by NCDOT forces. Good	Sand removal on certain areas. Repatching areas, routine patching, long term - resurface with I-2 asphalt.	\$100/year
Ferry Dock Parking	Shelter parking waiting area. 400 square yards of mat and seal coat	Good	Patching, sand removal	\$50/year
Maintenance Parking Lot	420 square yards of mat and seal coat of brown river rock	Good	Patching, sand removal	\$50/year

ROAD NAME/ IDENTIFIER	DESCRIPTION	CURRENT CONDITIONS	REPAIR NEEDS	REPAIR COST
<u>Mainland Side</u>				
Entrance/Boat Launch/ Maintenance Road	Entrance road to mainland parking .14 miles in length 18' wide main road 12' wide boat ramp	Repaved in 1979 with 1-1/2 of I-2 - 6 inches of ABC	Routine patching by NCDOT maintenance funds will take care of needs.	Varies
Mainland Ferry Parking Lot	Main parking lot for visitor parking approximately 100 spaces 4,051 square yards	Resurfaced in 1979 with 1-1/2 of I-2 and 6 inch- es of ABC stone. Fair to good condition	Restripe within next two years.	\$500
Mainland Maintenance Parking Lot	Parking for maintenance and office parking 460 square yards	Resurfaced in 1979 with 1-1/2 of I-2 and 6 inch- es of ABC stone. Fair to good condition	None	0

Sewer Inventory

SEWER SYSTEM	DESCRIPTION	CURRENT CONDITIONS	REPAIR NEEDS	REPAIR COST
<u>Mainland</u>				
Office Sewer	1,000 gallon septic tank with two 100-foot drainlines	Replaced in 1988 Good	Pump out sludge in septic tank	\$150
Waiting Area Shelter Sewer	1,000 gallon septic tank with two 100-foot drainlines	Replaced in 1988 Good	Pump out sludge in septic tank	\$150
Maintenance Area Sewer	1,000 gallon septic tank with one 140-foot drainline	Replaced in 1988 Good	Pump out sludge in septic tank	\$150
<u>Bear Island</u>				
Bathroom Sewer	1,000 gallon septic tank with two 100-foot drainline for each side - men's and women's	Replaced in 1988 Good	Pump out sludge in septic tank	\$300
Maintenance Area	1,000 gallon septic tank with two 100-foot lines	Replaced in 1988 Good	Pump out sludge in septic tank	\$300
Barracks Sewer	1,000 gallon septic tank with two 100-foot lines	Replaced in 1988 Good	Pump out sludge in septic tank	\$300

Electrical Power Distribution System

ELECTRICAL SYSTEM	DESCRIPTION	CURRENT CONDITIONS	REPAIR NEEDS	REPAIR COST
<u>Mainland</u>	The mainland is served by CP&L Power Company. The office and maintenance area power comes from an overhead transformer located on a power pole between the sun shelter and ferry dock.	System is owned by CP&L and is in good condition.	Power needs to be run underground. Sail boats occasionally hit overhead power lines.	\$20,000
<u>Island</u>	The island is served by Jones - Onslow Electric Membership Corporation through a 15 KV underground cable beginning at Shellrock Landing that goes across the intercoastal waterway to Bear Island. The underground power comes into the island at the personnel barracks, then on to the maintenance area and bathhouse. There is 9,850 linear feet in the marsh and intercoastal waterway and 2,500 linear feet on Bear Island. There are three transformers on the island.	The power distribution was replaced in 1988 with new cable. One year later this cable was cut and a new cable of 8,200 linear feet was installed with the original cable being reburied. The system is in good condition.	None	0

Water

WATER SYSTEM	DESCRIPTION	CURRENT CONDITIONS	REPAIR NEEDS	REPAIR COST
Mainland Water System	6-inch well of unknown depth and capacity that serves maintenance area, office and sun shelter with water. Distribution system is composed of 2-inch or less of PVC piping. Approximately 500 linear feet of PVC distribution lines. Condition of pump and controls are unknown.	Fair	Chlorinator	\$1,500
Island Water System	System has four shallow gravel packed wells with a depth from 8 to 13 feet. Replaced distribution system, pumps and well in 1990. The system has a 1,000 gallon storage tank with related controls. It has a dual feed chlorination system. The distribution system is composed of 1,750 linear feet of 6-inch PVC water main that supplies the bathhouse. The ferry dock is served by a 1,100 linear foot, 3-inch PVC line. The barracks and nature center is served by a 500 linear foot, 2-inch PVC line.	Good	Pump #4 has electrical problem.	\$500

Phone

PHONE SYSTEM	DESCRIPTION	CURRENT CONDITIONS	REPAIR NEEDS	REPAIR COST
<u>Mainland</u>	The phone system is served by Carolina Telephone Company.	There are two phone lines that serve the office and maintenance areas with five phones and one fax line. Pay telephone is located in waiting shelter.	Additional line for office.	\$360/year
<u>Island</u>	The island phone system is served by Carolina Phone Company. This was installed in 1988 with underground power cable.	There are three phones on the island with the emergency phone at bathhouse.	None	0

VIII. PARK OPERATIONS

INTRODUCTION

The major issues concerning Hammocks Beach State Park were identified by Division of Parks and Recreation staff at the initiation of the general management plan process. The issues have been divided into three categories: Natural resources (see Chapter VI), capital improvements (see Chapter VII and Chapter IX), and operations. This chapter identifies park operations issues at Hammocks Beach and makes recommendations for addressing them during the next five years.

Operations/management issues that are of significant concern at Hammocks Beach are:

1. inadequate staffing;
2. equipment needs;
3. increased private boating to Bear Island;
4. illegal hunting and camping;
5. boat ramp use;
6. public safety concerns;
7. concessions;
8. Bear Island road;
9. dredging of Cow Channel;
10. ferry alternatives;
11. underground power service needs;
12. 24-hour access to Bear Island; and
13. carrying capacity.

INADEQUATE STAFFING

Hammocks Beach State Park's geography presents unique management problems. The park contains two separate land areas, the mainland and Bear Island, that are divided by marsh and the intra-coastal waterway. With two separated land areas, staff time is partially consumed by traveling to and from Bear Island. In addition, the ferry operations linking the areas constitute a workload not found at other parks. The park also experiences weather associated with its coastal environment that substantially shortens the life of park equipment, facilities, and other improvements. Park staff are also subject to additional danger due to some of these conditions. For staffing purposes, therefore, Hammocks Beach should be considered more like two separate park units or as a park with a satellite area.

The park's two certified law enforcement officers cannot adequately operate, protect, and manage the park to the Division's minimum standards of operation. In addition, the two maintenance mechanics cannot adequately maintain both the mainland and island facilities and equipment. This inadequate level of staffing negatively impacts park management and facility upkeep, the ability to provide programs and assistance to visitors, and reduces visitor safety.

Hammocks Beach is open to the public approximately 3,741 hours per year. The available work hours for the superintendent and ranger, after allowing for vacation and holidays, total 3,620 hours. Available work hours for both maintenance personnel, after similar reductions for vacation and holidays, are 3,756. Work hours at the park are also reduced by sick leave, emergency call-back time, training classes, conducting programs, appearances in court, conferences, meetings, and other park business.

There are simply not enough work hours available for operations and visitor protection from the superintendent and ranger. Likewise, a shortage of work hours are available for maintenance purposes.

Even though there are staff shortages when the park is open, staff must often also be on duty outside of regular park hours to protect the park from poachers, to prepare for coastal storms, to repair outboard motors, and to search for lost, stranded, or overdue visitors. Additional patrols of Bear Island after park hours are needed.

With the park's limited staff, higher level employees must perform duties that could be performed by lower level employees. For example, the superintendent, ranger, or maintenance mechanic III may often be required to operate one of the ferry boats. This may occur anytime in the summer if a seasonal ferry captain is sick or if a vacancy occurs. Permanent staff are also required to operate the ferry boats more often during the spring and fall when seasonal workers are in school and unavailable for work. General park cleanup often has to be performed by the ranger or maintenance mechanics. Administrative, interpretive and education, operational, and maintenance duties must often be delayed, scaled down, or neglected as a result.

Recommendations

Hire two more rangers. This would allow both the mainland and the island to be staffed during park hours. All aspects of park operations would improve as a result. These rangers should obtain a ferry captain's license (like the superintendent and existing ranger). More school groups and the general public could be provided with transportation to Bear Island during the winter months, and interpretation and education programs could be greatly expanded.

Hire one general utility worker. The addition of this position would keep higher level maintenance mechanics from having to perform clean-up duties and would allow the maintenance mechanic III time for proper preventative maintenance on all boats.

Adding these three staff positions would adequately staff the park as it currently exists.

Table VIII-1. Current Staffing Needs

EXISTING FULL-TIME STAFF	PROPOSED ADDITIONAL STAFF
1 Park Superintendent II 1 Ranger II 1 Mechanic II 1 Maintenance Mechanic II 1 Office Assistant III	2 Rangers 1 General Utility Worker

EQUIPMENT NEEDS

The current budget for operating and equipment needs is inadequate to effectively manage the park. All park operations areas are affected, including natural resource management, interpretation and education, public safety, and maintenance. Vehicles wear out faster than usual because of the harsh coastal environment. Ferry motors operate almost constantly during the summer, so their life is also reduced. Equipment is needed to speed sand removal from the island road; a modified wave runner is needed for quick emergency response; night vision binoculars would aid law enforcement and public safety; and various equipment is needed to improve maintenance.

Recommendations

The following list of needed items is recommended for purchase.

	<u>Amount Requested</u>
<u>4521 - Office Equipment</u>	
Copier	\$ 2,800
Conference Table and 8 Chairs	2,700
<u>4522 - Data Processing Equipment</u>	2,500
Scanner	
Color Printer	
Computer Monitor, CD ROHM	
<u>4523 - Scientific, Medical Equipment</u>	
Night Vision Binoculars	2,500
Kayak, Rescue	700
<u>4539 - Other</u>	
Front End Loader/Sand Moving Equipment	10,000
Generator, Portable	1,000
Table Saw, Industrial, 12"	5,000
Radial Arm Saw, Industrial, 12"	6,000
Drill Press, Industrial	1,800

Items recommended for purchase (cont'd.)

Band Saw, Industrial	1,800
Water Pump, Portable	700
Oxy-Acetylene Torch	800
Auger, Portable	700
Miter Saw, 12"	800
Sign Router, Laminate Type	3,000
Lawn Mower Deck	2,000
Refrigerator	900

453900 - Audio Visual

None

4541 - Motor Vehicles

None

4543 - Boats, Outboard Motors

*Outboard Motors, 70HP (4) annually	2 @ \$3,700	7,400
Outboard Motor 155HP, commercial		4,800
Skiff, 19' (and trailer)		4,000
Jet Ski, "Sea Doo" Style with Deck		3,500

4544 - Trailers

Trailer for 19' Skiff	1,500
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4549 - Other Motorized Vehicles

*ATV	6,500
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* Denotes items that must be replaced frequently (1-3 years)

INCREASED PRIVATE BOATING TO BEAR ISLAND

Private boating to Bear Island has increased over the years, although no figures on the number of boats or passengers are available. Boats that are beached generally present no problems, but boats at the bulkhead do. The present mix of private boats and state ferries operating within the small ferry landing area at the island sometimes presents problems of congestion and associated safety concerns. A six-to-eight private boat capacity currently exists, and sometimes up to 10 may be found. Boat slips are not well defined. Disembarking and loading is a major concern. The bulkhead, particularly at lower tide levels, is much higher than desirable for safe use. Accessibility, both for private boaters and ferry users, needs to be provided for handicapped visitors.

Recommendations

Handicap lifts need to be provided both at the mainland and island. Piles for private boat tie-up should be provided at the island to better define private boat slips. A capital improvement project for these improvements exists. Private boating to Bear Island should be limited in keeping with the island's undeveloped character. Therefore, no expansion of the private boating docking area or other improvements to encourage private boating are proposed.

ILLEGAL HUNTING AND CAMPING

Illegal camping and hunting have been continuing problems on Bear Island. Because of the small number of staff, Bear Island is frequently without any staff presence in the off season. Campers and hunters can travel to Bear Island via private boats without staff knowledge. Some illegal camping has brought natural resource damage, vandalism, disturbance of registered campers, and concerns for general public safety.

Such incidents have not been as prevalent due to staff efforts to increase boat and foot patrols around remote areas of Bear Island. An increase in night patrols during the sea turtle nesting season has been effective, as there were no known incidents of sea turtles or their nests being disturbed in 1995.

Recommendations

Staff should continue off hours patrolling of Bear Island when possible, particularly in the sea turtle nesting season. Staff off-hours patrolling and overnight presence at Bear Island should be increased further when additional staff are hired, as recommended previously, particularly during peak visitor season and during hunting season. Night vision binoculars and other recommended equipment purchases would assist rangers with these patrols. Park staff should seek continued cooperation and assistance from the Wildlife Resources Commission.

MAINLAND BOAT RAMP USE

There is a small staff boat ramp at the mainland ferry docking/maintenance area. It was not designed for public access and use, nor is the parking lot designed to accommodate vehicles with trailers. The ferry landing and office area is extremely congested with the present mix of pedestrian and vehicle traffic, particularly in the summer season.

Members of the public sometimes request permission to use this boat ramp. Park staff have traditionally denied the requests. Registered campers sometimes use the ramp.

Recommendations

The boat ramp should not become a public ramp. It is not advisable to increase ferry area

congestion and the danger of pedestrian and vehicle conflict by allowing private boat traffic. Public use of this ramp would also likely increase private boating to Bear Island. Bear Island's mooring and docking facilities are already overcrowded at times. In the off-season, when park visitation is low, park staff may at its discretion allow public use of the ramp. Campers may continue, at staff discretion, to use the ramp as well.

PUBLIC SAFETY CONCERNS

There are several staff concerns for public safety at Bear Island. Bear Island presents an opportunity for remote, almost wilderness-like camping experiences. The limited access afforded by park ferries, marine taxis or private boats contributes to the remote and isolated nature of the camping experience. Campers frequently stay overnight on the island without any staff being there. An emergency telephone is located at the bathhouse and provides an adequate means of communication in the event of emergencies.

In addition to the dangers concomitant with remoteness, ticks, chiggers, spiders, and potentially rabid animals populate Bear Island. The changing nature of the coastal environment, especially the daily changes in ocean conditions, surf and rip tides, may not be readily apparent to the casual park visitor.

Recommendations

Park staff should continue and expand efforts to inform the public about these dangers. Visitors should be told not to approach or feed wild animals and to keep their campsites clean. Trash cans on the island should be emptied daily, and the use of animal-proof lockers like those used in National Park Service campgrounds should be investigated. Campers should be adequately forewarned that they will need to be self-sufficient during their overnight stays on the island. Staff should inform park visitors of the hazards of the maritime environment, especially the presence of rip tides. Descriptive warnings about hazardous conditions, as well as preventative measures a victim and potential rescuers might be able to take, needs presenting.

Information about these public safety concerns should be presented in a comprehensive manner. Individual handouts, bulletin boards, signs, and programs given by ferry operators and other park staff should all be used to educate park visitors. Good opportunities to educate the public exist at the island ferry landing, the bathhouse, the park office, and the ferry wait station. With proper notification of the conditions to be found on Bear island, park visitors should be able to adequately prepare for and enjoy the naturalness of Bear Island.

Increase staff overnight presence on Bear Island when additional staff is hired, and use seasonal staff for night duties where possible. These steps should improve public safety.

CONCESSIONS

Concession operations at Hammocks Beach are currently handled in-house. A bath house manager and concession stand manager are employed for the 15-week summer season. Salaries and merchandise costs exceed concession revenues, resulting in a loss on concession operations. There are also ancillary concession costs, such as equipment replacement and repair, utilities, and merchandise transportation and stocking costs that make the operating loss even greater. This net loss is undesirable, and GMP participants discussed how to improve concession operations and whether or not concessions should continue to be handled in-house.

Topics included in GMP discussions about concessions were how to provide for off-season access to the island, provision of alternate access to the island during the summer season, rental of canoes and/or boats, expansion of types of concession merchandise, and tours of Bear Island.

Leasing of the ferry service rather than in-house operation was also discussed. The ferry operation currently produces revenues of approximately \$51,700 annually. Salaries for the seasonal ferry captains and deck hands run approximately \$22,000, motors cost \$13,500, and fuel approximately \$6,400. The state currently owns and maintains the ferries. After these expenses and maintenance costs, not enough profit is left to interest a private concessionaire unless ferry rates were raised.

Recommendations

Although the bathhouse/concession stand currently operates at a loss, staff agreed that it was an essential public service that should continue to be provided. Revenues from the operations are not great enough to interest a private concessionaire, so the service should continue to be run in-house. Efforts to reduce the operating loss should be made by expanding the merchandise offered for sale, by increasing prices where possible, and by continuing to operate the concession stand only during the Memorial Day through Labor Day summer season when park visitation is high enough to justify having it open. Concession stand revenue for 1995 is shown in Table VIII-1.

The ferry operation should also continue to be operated in-house. GMP participants agreed that the Division should retain control of the ferry operation, thus ensuring quality operation. The Division should be in control of the quality of interpretive and educational programs given on the ferry, the safe transportation of park visitors both to and from the island, emergency evacuation of the island, scheduling of school and other groups, canceling of ferry operations in bad weather, and off-season scheduling. Current ferry operations were rated very high in a recent survey of park visitors. It may be desirable, however, to take another look at privatization of the ferry service some years in the future when it is time to replace the two ferries currently operating.

Table VIII-1. 1995 Hammocks Beach Concession Stand Revenues*

	<u>Week Ending</u>	Totals	
		<u>Weekly</u>	<u>Monthly</u>
April	4/2	\$10	
	4/9	22	
	4/16	18	
	4/23	13	
	4/30	10	
			73
May	5/7	16	
	5/14	15	
	5/21	8	
	5/28	256	
			295
June	6/4	405	
	6/11	528	
	6/18	545	
	6/25	670	
			2,148
July	7/2	794	
	7/9	947	
	7/16	814	
	7/23	824	
	7/30	835	
			4,214
August	8/6	873	
	8/13	817	
	8/20	517	
	8/27	313	
			2,520
September	9/3	558	
	9/10	123	
	9/17	35	
	9/24	20	
			736
October	10/1	10	
	10/8	6	
	10/15	9	
	10/22	9	
			34
Total 1995 Revenue:		\$10,025	

* Concession sales before Memorial Day and after Labor Day were made from the park office.

BEAR ISLAND ROAD

The Bear Island road runs approximately one-half mile from the ferry landing dock across the island to the bathhouse. In addition to staff vehicle use, the 10-foot wide road also serves as a walkway for park visitors, sometimes creating conflicts and concerns for visitor safety. The existing road surface (stone surface treated asphalt) is bumpy and not a good choice for handicapped accessibility. Sand accumulating on the road is also a problem.

Various suggestions to address concerns about the road were made and their merits discussed at the GMP meeting. These included providing a separate pedestrian walkway or widening the existing road to better accommodate pedestrian use; paving the road with a different type of surface; obtaining additional equipment for sand removal; and providing alternatives for handicapped accessibility. Since the donation of a golf cart to the park, the ability to provide assistance to handicapped visitors has improved. Such assistance has a heavy impact on staff time during summer months.

Recommendations

Safety concerns and the low level of use do not justify a separate walkway for pedestrian use. A separate walkway would be intrusive on the island's natural character and would also need maintenance and sand removal, both of which would be more difficult if apart from the road. Equipment for more cost-effective sand removal is needed, and its purchase is recommended.

When the existing road needs repaving, it should be widened from 10 to 12 feet to better accommodate pedestrian use. Park personnel, particularly seasonal workers, should continue to be made aware of pedestrian use of the road and strictly limit vehicle speeds. The road surface should be kept a light color to blend aesthetically with the island. Resurfacing in light-colored concrete may provide the best surface from aesthetic, maintenance, and handicapped accessibility standpoints; however, such a surface would be much more expensive than the current surface and may not justify the additional cost. A decision should be made when repaving is needed. The maintenance area road spur and parking area should be kept in the existing stone surface treated asphalt.

Park staff should continue to assist handicapped visitors with transportation to the beach area when needed.

DREDGING OF COW CHANNEL

The ferry channel to Bear Island, called Cow Channel, generally needs dredging every five to eight years to keep a 7-foot deep by 25-foot wide channel. This was last done in 1994 at a cost of \$220,000. The ferry basins periodically need dredging as well. Of course, the need for dredging can be suddenly altered by severe weather and currents.

Dredging is currently undertaken on an as-needed basis through the bidding process. Hammocks

Beach staff want the cost-effectiveness of obtaining a long-term maintenance agreement investigated. Dredging must be conducted under permit issued by the Division of Coastal Management. Finding a place to deposit spoil from the dredging may be a problem in the future. The island that was used for spoil placement the last time dredging was done will soon reach its capacity for taking additional sand.

Recommendations

Further study of the dredging issue will need to be done. No change is recommended at this time. A capital improvement project to provide for dredging the next time it is needed has been prepared.

FERRY ALTERNATIVES

The Division strives to provide safe, effective, and efficient ferry operations. The park currently has two 36-passenger ferries powered by outboard motors. The use of other types of watercraft, particularly hovercraft/air boats, was investigated to determine if better alternatives are available. These other types of boats proved to be prohibitively expensive. Fuel and maintenance costs would be higher than what the Division currently experiences, and licenses to operate would apparently be more difficult to obtain.

There are also other negative aspects to switching. Noise created by this type of water craft would disrupt the integrity of the area while also disturbing wading birds; jet blast and water spray would not be popular with private boaters; this type of watercraft is not readily available in North Carolina and therefore maintenance, parts, facilities, and tools would be expensive; current maintenance and docking areas would need renovating; and additional federal regulations would apply. While passengers could be moved faster and dredging costs would be somewhat lower, the negatives of hovercraft/air boats clearly outweigh the positives. A 1991 survey of park visitors shows a high level of satisfaction with the existing ferry operation. Sixty-six percent rated ferry quality as excellent and 32 percent good. The slow, peaceful ferry ride to Bear Island and the scenic beauty are a nice prelude to visiting the island. The existing type of ferry trip also offers an excellent opportunity for interpretation.

Recommendations

Continue to use the existing ferries through their useful lives. When they need replacing, the Division should study the alternatives for similar types of watercraft.

POWER SERVICE NEEDS

There is an overhead power line that runs to the maintenance area. The line crosses the maintenance area road near the boat ramp and existing parking and ferry dock area. While the boat ramp is not a public ramp, there is a danger of having boat masts strike the power line. LWCF regulations call for underground placement of such lines.

Bear Island's electricity is fed via an underwater cable from the mainland. A backup source of power needs to be maintained.

Recommendations

Place the overhead power line near the maintenance area boat ramp underground. Annually check the backup cable to Bear Island to ensure that it is in working order.

AFTER HOURS ACCESS TO BEAR ISLAND

After hours access to Bear Island has been a continuing problem. Unlike most parks, there are no gates to close that deter access. Private boaters have easy access to the island, before and after closing hours, and this access brings concomitant problems such as illegal hunting, camping in undesignated areas, open fires, and disturbance of campers and nesting turtles. Even when there are no behavioral problems, such as visitors simply fishing during the night, the fact remains that park staff is unaware of their presence.

The island is frequently left unstaffed at night even when campers are present. Staff additions being recommended would allow for increased patrolling after hours and for additional overnight coverage.

Recommendations

Continue boat and foot/vehicle patrols of Bear Island to lessen unauthorized use, particularly in the sea turtle nesting season. Continue to periodically patrol park boundary lines throughout the year to ensure that markers and signs are visible and in place. Continue to enlist the cooperation of the Wildlife Resources Commission to assist in controlling illegal hunting.

OPTIMUM CARRYING CAPACITY

Park and recreation agencies often attempt to establish optimum carrying capacities for their areas and facilities. Carrying capacity is the maximum number of visitors an area or facility can handle without undue detrimental effects to the area of facility or to the quality of the recreational experience. GMP participants agreed that an optimum carrying capacity for Bear Island should be established.

Many factors must be taken into consideration before an optimum carrying capacity for Bear Island can be determined, including: the ability of the natural resources to absorb use; the potential for construction of recreational and support facilities; sewage treatment capacity; emergency evacuation; the park purposes; the quality of the recreational experience; staffing needs; and aesthetics.

At present, the island is considered full when the ferries have carried approximately 370 people

to the island. Park visitors must also be transported off the island at the end of the day, a task that sometimes must be extended past regular closing hours.

Recommendations

The Division should establish an optimum carrying capacity for Bear Island. This should be done prior to any significant changes being taken that would dramatically affect the island's maximum daily visitation, currently approximately 370 people, plus the visitation from private boating.

IX. MASTER PLAN

INTRODUCTION

No master plan to guide park land acquisition and facility development was ever prepared for Hammocks Beach State Park. Acquisition and development has instead been guided by a conceptual plan that was drawn in May of 1988. The conceptual plan called for the acquisition of approximately 164 acres on the mainland and for development of recreational and support facilities.

As a part of the Hammocks Beach State Park general management plan process, the 1988 Conceptual Plan and the project priority list based upon that plan were carefully reviewed. Division staff and Park Advisory Committee comments from review of the conceptual plan were considered and discussed. Changes were determined to be needed, and a revised plan and revised project priority list were developed. This revised plan will serve as the park's master plan and replaces the 1988 Conceptual Plan.

Development of the master plan was guided by the park purpose statement and applicable laws and policies. The plan seeks to recommend acquisition and development that are compatible with the park's significant geological, biological, scenic, recreational, and archaeological resources. It also seeks to promote pride in and understanding of the park's natural heritage.

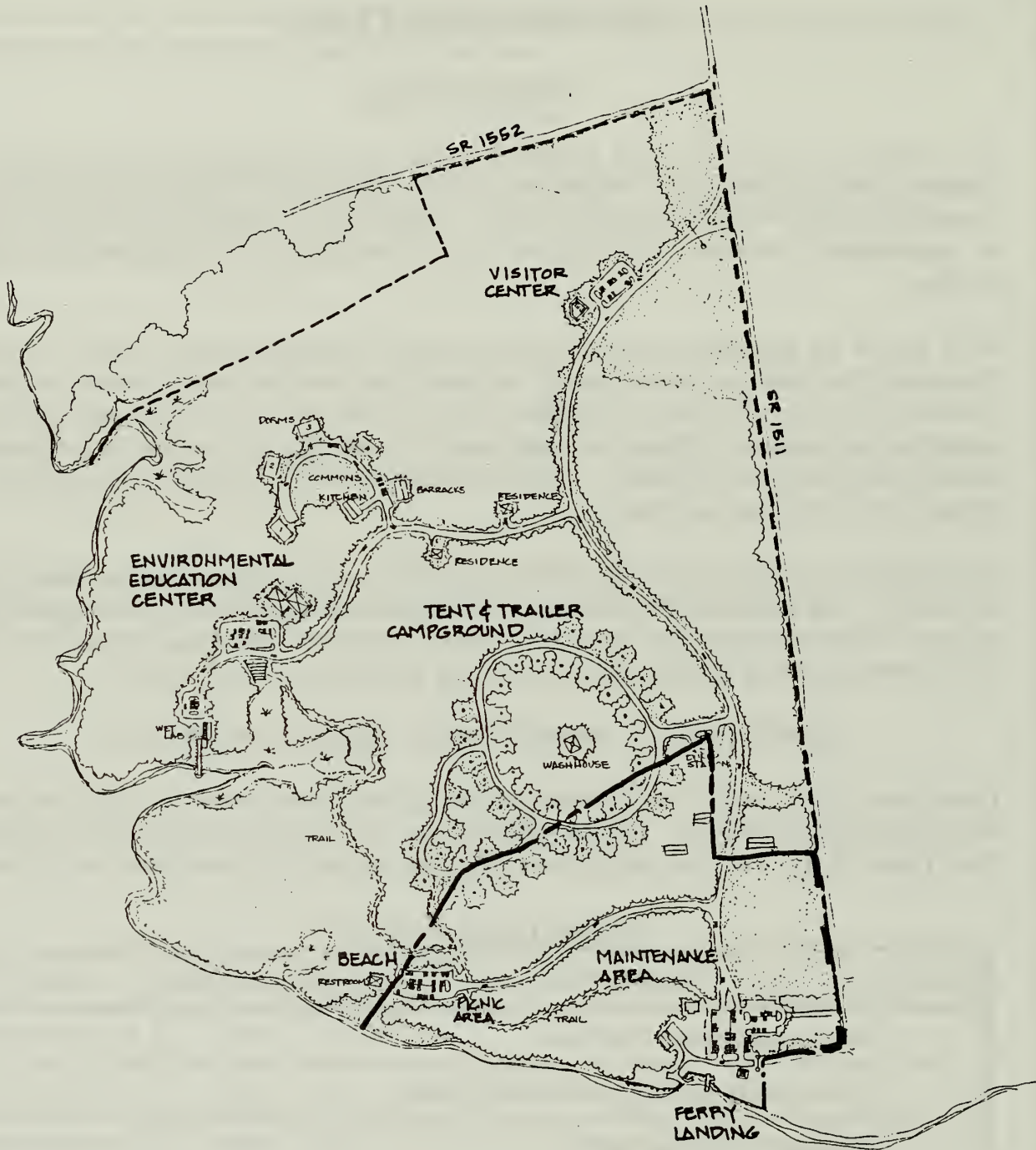
MAJOR CAPITAL IMPROVEMENT PROJECT PRIORITIES

Development of new capital improvement priorities for the master plan started with a review of the original project priority list. This list, which follows, was developed from the 1988 Conceptual Plan (Figure IX-1). The first three projects have been dropped; the others have been revised.

Original Project Priority List

RANK	DESCRIPTION	MEAN SCORE	COST
1	Bear Island Sanitary Facilities	775	\$ 133,377.53
2	Nature Study Building Renovation/Exhibits	615	261,393.17
4	Mainland Toilet/Sun Shelter	560	244,907.78
4	Visitor Center - Land Dependent	554	1,431,025.37
5	Bear Island Landing Improvements	547	261,855.02
5	Picnic Area Development	527	472,786.54
7	Mainland Barracks/Island Duty Station Renov.	497	451,700.83
Total Cost:			\$3,257,046.24

Figure IX-1. Conceptual Plan of Hammocks Beach State Park



CONCEPTUAL PLAN

MAY 1988

HAMMOCKS BEACH STATE PARK

Changes to the Original Project Priority List

Evaluation of the original project priority list's proposed capital improvement projects resulted in numerous changes and the development of a revised project priority list. A brief explanation of those changes follows:

Bear Island Sanitary Facilities

This project has been deleted. Neither the Hammocks Beach Park Advisory Committee nor the park superintendent supported the development of toilet facilities at the island dock. Such facilities, if built, would likely attract boaters looking for convenient restrooms, and boating traffic is already a problem. Restrooms located at the bathhouse were deemed adequate for the current level of camping and day use. Restrooms are also available on the mainland.

Nature Study Building Renovations/Exhibits

This project has been deleted. Instead of extensive renovations, GMP recommendations call for maintaining the building under FIIP repairs. The long range plan now calls for moving the major interpretive area to the bathhouse and providing exhibits there. Such a move should result in increased interpretation and education participation.

Mainland Toilet/Sun Shelter

This project, which called for renovations of the structure and septic system, has been deleted. GMP recommendations call for maintaining the existing structure and septic system until a new visitors center is built. The new visitors center and ferry landing will be at a different location.

Visitors Center/Ferry Land Relocation (\$2,998,899)

The location of this high priority project has been changed. The visitors center should be located so that it offers a vista of the water. It also should be located near the ferry dock to allow better staff oversight of the ferry operations, to encourage park visitors to examine interpretation and education exhibits, and to minimize vehicle traffic in the park. Construction of a new ferry landing and support facilities for the ferry operation have been added to the project. Project costs include demolition of the existing ferry shelter, construction of an access road and parking for the new visitors center and ferry area, construction of the dock/ferry landing/passenger loading area, and construction and furnishing of the new visitors center. The new location being proposed for the visitors center will allow visitor services to be separated from the park maintenance area.

Bear Island Landing Improvements (\$366,852)

Costs for this project have been revised to reflect the current market. In addition, minor extension to the bulkhead will be made and handicapped lifts added. The island dock will be repaired as needed and piles added for private boat tie-up. A water fountain will be added to the ferry waiting area/sun shelter, and electrical power to the docks is included.

Picnic Area Development (\$567,916)

The location of this project has been changed and the project is now dependent on the acquisition of additional land. Without land acquisition, the scope of the picnic area development will need to be reduced. Planned development will include extending utilities to the site, an access road and parking for 50 cars, a toilet building, and picnic shelters. A second picnic shelter has been added to the project to accommodate an additional group or class.

Mainland Barracks/Island Duty Station Renovation (\$621,093)

Rather than renovate the existing office for barracks, GMP recommendations call for construction of a new structure to house 17 seasonal staff. A new building will function much better as a barracks. The renovation of the island duty station remains unchanged. The existing office will be renovated as a residence, its former use, as a separate project.

New Capital Improvement Projects

In addition to the changes to the original project priority list projects described above, GMP recommendations call for the addition of new capital improvement projects. An explanation of these new projects follows.

New Bathhouse/Interpretive Structure (\$1,377,240)

The existing bathhouse is showing signs of structural problems. In addition, the shower areas contain large amounts of asbestos. When the existing bathhouse needs replacing, a new, smaller structure that is more efficient in space allocation will be built. The new bathhouse will also be designed to provide an interpretation and education area in order to better serve the public. The project also includes interpretation and education exhibits, materials, and equipment.

Archaeological Survey for Total Park Development (\$182,879)

Hammocks Beach State Park has a high probability of significant archaeological resources. An archaeological survey would investigate the park land and recommend the location of new park development.

Renovate Existing Office for Ranger Residence (\$121,801)

Instead of being renovated as a barracks, the existing office (formerly a residence) will be renovated to become a ranger residence. This renovation will take place after construction of the new visitor center and will provide a second residence needed for park staff.

Building Renovations and Demolitions (\$271,168)

This project would bring all existing park buildings up to current fire, safety, and Americans with Disabilities Act regulations.

Island Crosswalk/Road Improvements (\$390,686)

This project includes hardening the rolled gravel crosswalk/road from the ferry landing across the island to the beach. Doing so will improve handicap accessibility. A final decision on the type of road surface will need to be made based on cost, durability and aesthetics. A rest shelter that offers shade from the sun will be built halfway along the road, and a handicapped accessible picnic shelter will be constructed at the bathhouse.

Maintenance Dredging of Cow Channel and Landing (\$335,500)

Coastal storms and tides constantly shift sand and channel locations. Dredging is needed every five to eight years to maintain an adequate channel depth.

Revised Project Priority List

RANK	DESCRIPTION	MEAN SCORE*	COST
1	Mainland Barracks/Island Duty Station Renov.	637	\$ 621,093
2	New Bathhouse/Interpretive Structure	635	1,377,240
3	Island/Mainland Landing Improvements	614	366,852
4	Archaeological Survey for Total Park Devel.	614	182,879
6	Visitor Center - Ferry Landing Relocation	583	2,998,899
6	Renovate Existing Office for Ranger Residence	570	121,801
7	Picnic Area Development - Land Dependent	547	567,916
6	Building Renovations and Demolitions	541	271,168
6	Island Crosswalk/Road Improvements	522	390,686
10	Maintenance Dredging of Cow Channel/Landings	506	335,500
Total Cost:			\$7,234,034

* The mean score comes from the Division's Project Evaluation Program (PEP). The PEP uses an evaluation formula to rank projects that considers three factors: the objective of the project; the justification or urgency for funding; and the estimated annual number or persons (visitors and/or employees) who are affected by the project. Projects are evaluated by the park superintendent, district superintendent, and Division management.

The Division will attempt to undertake the 10 projects on the revised project priority list shown above during the next five years. Other capital improvement projects are also proposed for the longer term that are dependent upon additional land acquisition. These include development of a tent and trailer campground with an amphitheater and trails. Project descriptions and cost estimates for these will be prepared during future GMP updates.

LAND ACQUISITION NEEDS

Many visitors come to the park without taking the ferry to Bear Island. In 1995, total attendance was over five times the 30,825 people taking the ferry. Expansion of the mainland area and facilities to offer these visitors additional recreational opportunities and interpretive and educational programs is highly desirable. Improved mainland facilities are also needed to serve existing park use. Therefore, GMP participants and park advisory committee members agreed that additional mainland land acquisition is a high priority.

The proposed new visitors center could be squeezed onto existing park property, but the preferred alternative is to acquire additional land. Without land acquisition, sufficient park buffer would not exist, and future uses of adjacent property might negatively affect the park and visitors at the ferry landing and visitors center. There is only enough existing park land for a small picnic area; with additional land, an adequately sized picnic area with shelters could be constructed. Not enough existing park land is currently available for a trail from the visitors center; additional land acquisition will provide the land base needed for trails. Also, without additional land acquisition, the visitors center would have to be located closer to the park maintenance area than is desirable.

The revised plan for Hammocks Beach State Park (Figure IX-2) shows the visitors center in its optimal location, with a beautiful vista over the inland waterway and Queen's Creek. Picnic facilities — including two picnic shelters — are located near the visitors center, and acreage is provided for development of a hiking trail.

Future development of a camping area with trails and an amphitheater is also shown on the revised plan. The Division does not offer any coastal camping at nearby Fort Macon State Park or Theodore Roosevelt State Natural Area, and only a few primitive camping sites are available on Bear Island. Demand certainly exists for camping, and development of overnight facilities on the mainland would offer a safer and different camping experience from the island, and a camping experience that is generally more popular with the public.

LAND ACQUISITION SUMMARY

The revised land acquisition needs at Hammocks Beach State Park are approximately 133 acres.

Bear Island Acreage	892	acres
Mainland Acreage	<u>33</u>	
Current Park Acreage (January, 1997)	925	
Future Land Needs	<u>133</u>	
Total Planned Acreage	1058	acres

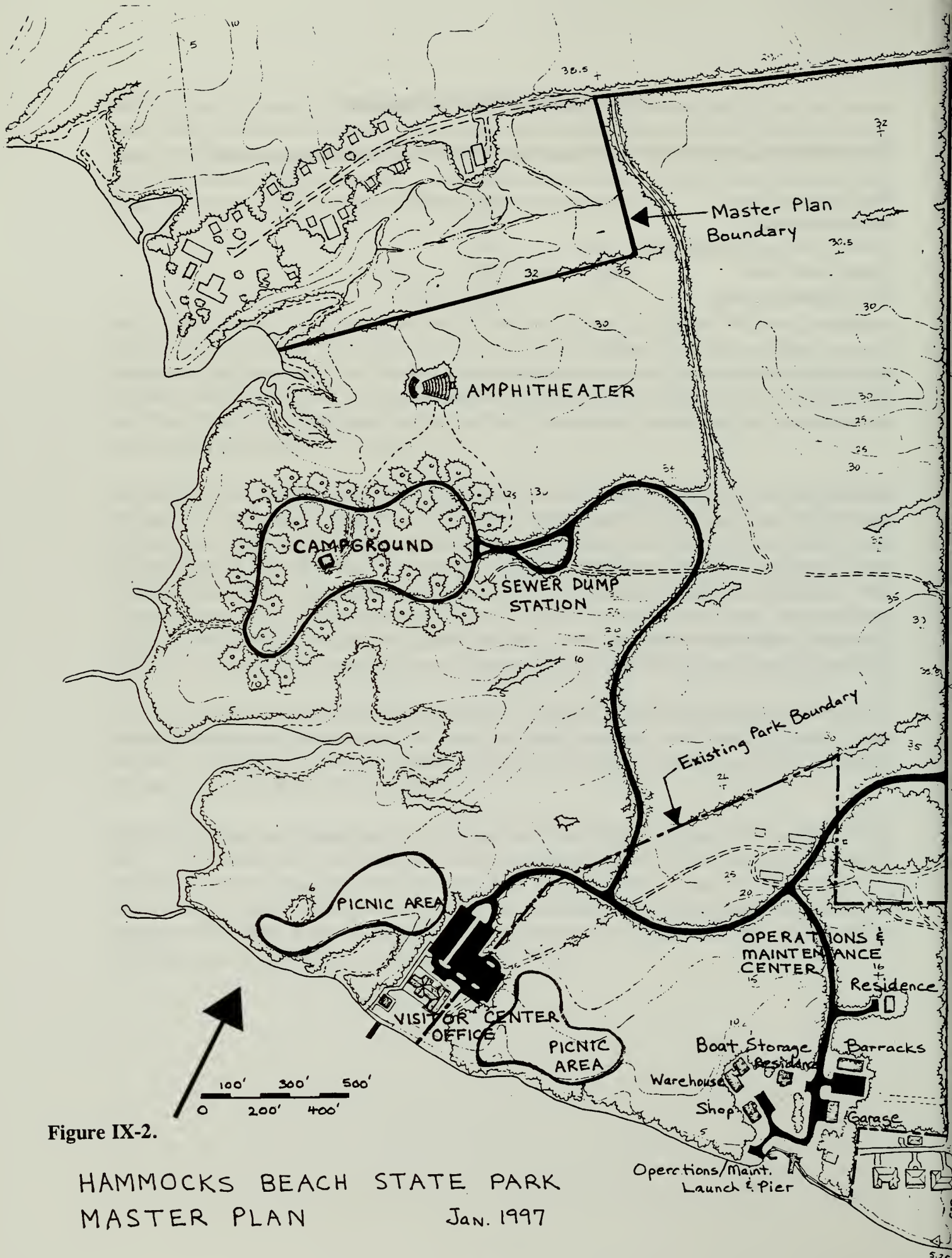


Figure IX-2.

HAMMOCKS BEACH STATE PARK MASTER PLAN

JAN. 1997

